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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R1–ES–2017–0035; FF09E22000 FXES11130900000 201]

RIN 1018-BA43

Endangered and Threatened Wildlife and Plants; Removing the Borax Lake Chub from the List of Endangered and Threatened Wildlife

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule; availability of post-delisting monitoring plan.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service or USFWS), are removing the Borax Lake chub (currently listed as *Gila boraxobius*), a fish native to Oregon, from the Federal List of Endangered and Threatened Wildlife on the basis of recovery. This final rule is based on a review of the best available scientific and commercial information, which indicates that the threats to the Borax Lake chub have been eliminated or reduced to the point where the species no longer meets the definition of an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act).

DATES: This rule is effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: This final rule, the post-delisting monitoring plan, and supporting documents are available on the Internet at <http://www.regulations.gov> in Docket No. FWS–R1–ES–2017–0035, or at <https://ecos.fws.gov>. In addition, the supporting file for this final rule will be available for public inspection by appointment, during normal business hours, at: U.S. Fish and Wildlife

Service, Oregon Fish and Wildlife Office, 2600 SE 98th Avenue, Suite 100, Portland, OR 97266; telephone: 503-231-6179.

FOR FURTHER INFORMATION CONTACT: Paul Henson, State Supervisor, Oregon Fish and Wildlife Office, 2600 SE 98th Avenue, Suite 100, Portland, OR 97266; telephone: 503-231-6179. If you use a telecommunications device for the deaf (TDD), call the Federal Relay Service at 1-800-877-8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, a species warrants protection through listing if it is endangered or threatened. Conversely, a species may be removed from the Federal List of Endangered and Threatened Wildlife (List) if the Act's protections are determined to be no longer required based on extinction, recovery, or the listed entity not meeting the statutory definition of a species. Removing a species from the List can be completed only by issuing a rule. This rule removes the Borax Lake chub (*Gila boraxobius*) from the List due to recovery.

The basis for our action. We have determined that the Borax Lake chub is no longer at risk of extinction now nor likely to become so in the foreseeable future, and the following criteria for delisting described in the species recovery plan have been met or exceeded:

- The presence of a naturally reproducing population of Borax Lake chub in Borax Lake that is free of exotic species;
- Permanent protection of the 160-acre (65-hectare) parcel of land surrounding and including Borax Lake;
- Removal of threats to subsurface waters from geothermal energy exploration or development;

- Reestablishment of ponds and natural marshes adjacent to Borax Lake in order to create more chub habitat;
 - A viable, self-sustaining population of Borax Lake chub;
 - Permanent protection of a second 160-acre (65-hectare) parcel of land to the north of Borax Lake;
 - Withdrawal of Borax Lake waters from appropriation (*i.e.*, diversion and use under water right);
 - Establishment of a fence around the 640-acre (259-hectare) critical habitat area to prevent vehicle entry;
 - Establishment of monitoring programs to survey habitat and fish population status;
- and
- Lack of any new threats to the species or ecosystem for 5 consecutive years.

We consider the Borax Lake chub to be a conservation-reliant species, which we consider to be a species that has generally met recovery criteria but requires continued active management to sustain the species and associated habitat in a recovered condition (see Scott *et al.* 2005, entire). To address this management need, the Bureau of Land Management (BLM), the Oregon Department of Fish and Wildlife (ODFW), and the Service developed, and are implementing, the Borax Lake chub cooperative management plan (CMP) (USFWS *et al.* 2018), and are committed to the continuing long-term management of this species.

Peer review and public comment. We evaluated the species' needs, current conditions, and future conditions to support our February 26, 2019, proposed rule. We sought comments from independent specialists to ensure that our determination is based on scientifically sound

data, assumptions, and analyses. We invited these peer reviewers to comment on the draft post-delisting monitoring plan. We considered all comments and information we received during the public comment period on the February 26, 2019, proposed rule to delist the Borax Lake chub and the draft post-delisting monitoring plan when developing this final rule.

Background

Previous Federal Actions

On May 28, 1980, we published a rule in the *Federal Register* to emergency-list the Borax Lake chub (as *Gila* sp.) as endangered and to designate critical habitat for the species (45 FR 35821). The emergency rule provided protection to this species for 240 days, until January 23, 1981.

On October 16, 1980, we proposed to list the Borax Lake chub (as *Gila boraxobius*) as an endangered species and to designate critical habitat (45 FR 68886). The distribution of the Borax Lake chub is limited to Borax Lake, its outflow, and Lower Borax Lake in Harney County, Oregon. The proposed listing action was taken because proposed geothermal development in and around Borax Lake, and human modification of the lake, threatened the integrity of the species' habitat and, hence, its survival.

On October 5, 1982, we published a final rule in the *Federal Register* (47 FR 43957) listing the Borax Lake chub (as *Gila boraxobius*) as endangered and designating areas totaling 640 acres (ac) (259 hectares (ha)) in and around Borax Lake as critical habitat for the Borax Lake chub. A recovery plan for the species was completed on February 4, 1987 (USFWS 1987).

Our most recent 5-year review of the status of Borax Lake chub, completed on August 23, 2012 (USFWS 2012), concluded that the Borax Lake chub's status had substantially improved since listing, and that the Borax Lake chub no longer met the definition of an

endangered species, but may meet the definition of a threatened species throughout all of its range, under the Act (16 U.S.C. 1531 *et seq.*); the review recommended the Borax Lake chub be reclassified from endangered to threatened (*i.e.*, “downlisted”). However, this final rule, which is based on information contained in the 2012 status review as well as additional information that subsequently became available, removes the Borax Lake chub from the List (*i.e.*, “delists” the species) due to recovery.

On February 26, 2019, we published a proposed rule in the *Federal Register* (84 FR 6110) to delist the Borax Lake chub on the basis of recovery. In that document, we requested information and comments from the public and peer reviewers regarding the proposed rule and the draft post-delisting monitoring plan for the Borax Lake chub.

Species Information

At the time of listing, the genus *Gila* was considered to include three subgenera: *Gila*, *Siphateles* (including the Borax Lake chub), and *Snyderichthys* (Uyeno 1961, pp. 84–85; Bailey and Uyeno 1964, pp. 238–239). Since our final listing determination (47 FR 43957; October 5, 1982), analysis of lepidological (scale morphology and arrangement) and osteological (structure and function of bones) characters (Coburn and Cavender 1992, pp. 344–347) and mitochondrial ribosomal RNA sequences (Simons and Mayden 1997, p. 194; 1998, p. 315; Simons *et al.* 2003, pp. 71–76) have indicated that the genus *Gila* in the broad sense was not descended from a common ancestor not shared with other groups. Therefore, the three subgenera were elevated to genera. The American Fisheries Society (Page *et al.* 2013, p. 78) has also followed this approach and classified the Borax Lake chub within the genus *Siphateles*. Consequently, the current scientific name of the Borax Lake chub is *Siphateles boraxobius*. This taxonomic revision changed the name of the listed entity from *Gila boraxobius* to *Siphateles boraxobius*, but did not

alter the description, distribution, range, or listing status of the species from what it was at the time of listing. Based on this revision, we consider *Siphateles boraxobius* to be the most appropriate scientific name for this taxon. Because we are removing the species from the List, we are not amending the species' scientific name on the List, but relevant documents, such as the post-delisting monitoring plan for the species, will reflect this usage.

A recent genetic assessment by Smith *et al.* (2019, pp. 497–499) affirms genetic divergence between Alvord chub (*Siphateles alvordensis*) and Borax Lake chub approximately 6,000 to 9,000 years ago, presumably as Lake Alvord dried at the end of the last period of glaciation, isolating Borax Lake. The analysis further supports the status of these two as distinct species consistent with past studies of morphological data (Williams and Bond 1980, entire).

The Borax Lake chub is a small minnow (Family: Cyprinidae) endemic to Borax Lake and its outflows. Borax Lake is a 10.2-ac (4.1-ha) geothermally heated, alkaline spring-fed lake in southeastern Oregon. The lake is perched 30 feet (ft) (10 meters (m)) above the desert floor on large sodium-borate deposits (Williams and Bond 1980, p. 297). Water depth averages approximately 3.3 ft (1.0 m), with a maximum measured depth of 88.6 ft (27 m) at the thermal vent (Scheerer and Jacobs 2005, p. 6). The lake bottom includes patches of bedrock and fine gravel, with a sparse growth of aquatic plants, and is covered with thick, fluffy silt. Average lake temperatures range from a high of 39.2 degrees Celsius (°C) (102.6 degrees Fahrenheit (°F)) to a low of 22 °C (71.6 °F) near the shoreline (Scheerer *et al.* 2013, pp. 3–6). Borax Lake chub prefer the shallow habitats along the margins of the lake (Perkins *et al.* 1996, p. 8).

The Borax Lake chub is an opportunistic omnivore. The diets of juveniles and adults are very similar and include aquatic and terrestrial insects, algae, mollusks and mollusk eggs, aquatic worms, fish scales, spiders, and seeds (Williams and Williams 1980, p. 113). Males and females

can reach reproductive maturity within one year. Spawning occurs primarily in the spring months but can occur year-around (Williams and Bond 1983, pp. 412–413). The reproductive behavior and length of incubation is unknown.

Population abundance estimates for the Borax Lake chub were conducted annually from 1986 to 1997, from 2005 to 2012, and from 2015 to 2017. Over this period, the population abundance has shown a high degree of variability, ranging from a low of 1,242 in 2015, to a record high of 76,931 in 2017 (Scheerer *et al.* 2015, p. 3; Meeuwig 2017, pers. comm.). A pattern of population reduction followed by a 1- to 5-year period of rebuilding has been observed multiple times during the period of record. The mechanisms contributing to variability in abundance are not entirely clear, but Scheerer *et al.* (2012, p. 16) surmised that because Borax Lake chub experience water temperatures that are at or near their thermal critical maximum (Williams and Bond 1983, p. 412), survival and recruitment are likely higher during years when water temperatures are cooler in the lake. Water temperatures in Borax Lake are driven by a deep geothermal aquifer with water temperatures up to 40 °C (140 °F) (Perkins *et al.* 1996, p. 2). Water temperature is also influenced by a variety of other factors, including air temperature, inflow from smaller geothermal and cool water springs, ephemeral thermoclines between areas of relatively cooler and warmer water, and wind.

Recovery and Recovery Plan Implementation

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of threatened and endangered species unless we determine that such a plan will not promote the conservation of the species. Recovery plans are not regulatory documents and are instead intended to establish goals for long-term conservation of a listed species; define criteria that are designed to indicate when the threats facing a species have been

removed or reduced to such an extent that the species may no longer need the protections of the Act; and provide guidance to our Federal, State, and other governmental and nongovernmental partners on methods to minimize threats to listed species. There are many paths to accomplishing recovery of a species, and recovery may be achieved without all recovery criteria being fully met. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished or become obsolete, yet the Service may judge that, overall, the threats have been minimized sufficiently, and the species is robust enough, to reclassify the species from endangered to threatened or perhaps to delist the species. In other cases, recovery opportunities may have been recognized that were not known at the time the recovery plan was finalized. These opportunities may be used instead of methods identified in the recovery plan.

Likewise, information on the species may subsequently become available that was not known at the time the recovery plan was finalized. The new information may change the extent that criteria need to be met for recognizing recovery of the species. Recovery of species is a dynamic process requiring adaptive management that may, or may not, fully follow the guidance provided in a recovery plan.

The following discussion provides a brief review of recovery planning and implementation for the Borax Lake chub, as well as an analysis of the recovery criteria and goals as they relate to evaluating the status of the taxon.

The Borax Lake Chub Recovery Plan (USFWS 1987, pp. 27–30) described an “interim objective” for potential reclassification to threatened status, as well as a “primary objective” for recovery that could result in removal of the species from the List (*i.e.*, delisting). It established the following four conditions as criteria for reclassification from endangered to threatened status (*i.e.*, downlisting):

(1) The presence of a naturally reproducing population of the Borax Lake chub in Borax Lake that is free of exotic species;

(2) Permanent protection of the 160-ac (65-ha) parcel of land surrounding and including Borax Lake (T37S, R33E, sec. 14) by The Nature Conservancy (TNC) or other appropriate public resource agency;

(3) Removal of threats to subsurface waters from geothermal energy exploration or development; and

(4) Reestablishment of ponds and natural marshes adjacent to Borax Lake in order to create more chub habitat, and reestablishment of Lower Borax Lake by waters from Borax Lake in order to create more habitat.

The recovery plan stated that conditions to meet the primary objective of recovery (*i.e.*, delisting) include the above four downlisting conditions as well as the following six additional conditions:

(1) A viable, self-sustaining population of Borax Lake chub, which is defined as a naturally sustaining population that is free of exotic species and fluctuates in size within the seasonal ranges observed in 1986–1987;

(2) Permanent protection of a second 160-ac (65-ha) parcel of land to the north of Borax Lake (T37S, R33E, sec. 11) by TNC or another appropriate public resource agency;

(3) Withdrawal of Borax Lake waters from appropriations (*i.e.*, diversion and use under water right);

(4) Establishment of a fence around the 640-ac (259-ha) critical habitat area to prevent vehicle entry;

(5) Establishment of monitoring programs to survey habitat and fish population status;
and

(6) Lack of any new threats to the species or ecosystem for 5 consecutive years.

Recovery Plan Implementation

Significant conservation objectives that address the primary threats to the Borax Lake chub have been accomplished through implementing the 1987 recovery plan, including protection of the Borax Lake ecosystem from disturbances through acquisition of key private lands, protection of subsurface and surface waters, closure of fragile lands to vehicle access, removal of livestock grazing, monitoring, and other recovery actions. The following discussion summarizes information on recovery actions that have been implemented under each downlisting and delisting criterion.

Conservation Management Plan

In recognition of the fact that we consider the Borax Lake chub to be a conservation-reliant species, the BLM, the ODFW, and the Service developed, and are implementing, the Borax Lake chub CMP (USFWS *et al.* 2018), and are committed to the continuing long-term management of this species. While the CMP provides agency commitments for long-term stewardship of Borax Lake and Borax Lake chub, the CMP is a voluntary agreement and delisting is not dependent upon implementation of the actions described in the CMP. However, we anticipate the plan will be implemented into the foreseeable future for the following reasons. First, each of the cooperating agencies has established a long record of engagement in conservation actions for the Borax Lake chub, including the BLM's prior contributions through land acquisition and 3 decades of habitat management around Borax Lake; scientific research and monitoring by the ODFW dating back to 1986; and funding support, coordination of

recovery actions, and legal obligations by the Service to monitor the species into the future under the Borax Lake chub post-delisting monitoring plan. In addition, all three cooperating agencies are active participants in the Oregon Desert Fishes Working Group, an interagency group facilitated by the Service that meets annually to discuss recent monitoring and survey information for multiple fish species, including Borax Lake chub, as well as to coordinate future monitoring and management activities.

Second, implementation of the CMP is already underway. For example, under the guidance of the CMP, the BLM has conducted quarterly site visits to determine the general health of the Borax Lake ecosystem. The BLM and TNC have maintained the fence and gate around Borax Lake to prevent unauthorized vehicle access. ODFW has maintained water temperature and water elevation monitoring equipment, monitored the State of Oregon's Department of Geology and Mineral Industries (DOGAMI) drilling permits, and conducted regular abundance estimates to assess the status of the population. The Service has continued to provide funding, when available, to support monitoring efforts.

Third, the conservation mission and authorities of these agencies authorize this work even if the species is delisted. For example, the Burns District BLM's resource management plan (RMP) and BLM Manual 6840.06E both provide general management direction for special status species, including the Borax Lake chub. "Special status" species for the BLM include sensitive, proposed for listing, threatened, and endangered species. When delisted, the Borax Lake chub will still be considered a "special status" species, as it meets the criteria to be "sensitive" for the BLM. According to the BLM's *Criteria for determining FS R6 and OR/WA BLM Sensitive and Strategic Species* (July 13, 2015), all federally delisted species that are suspected or documented on BLM or U.S. Forest Service lands are considered "sensitive" for the

duration of their post-delisting monitoring plan unless the species meets some of the other criteria for being “sensitive.” In this case, being a State/Oregon Biodiversity Information Center (ORBIC) rank 1 species, with a Heritage program/NatureServe rank of S1 puts the Borax Lake chub firmly in the “sensitive” category (Huff 2019, pers. comm.; ORBIC 2016, p. 5). Special status species lists and criteria are updated and transmitted to the BLM Districts approximately every 3 years through the State Director, who then directs the Districts to use the new list (Huff 2019, pers. comm.). The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*) directs the BLM to manage public land to provide habitat for fish and aquatic wildlife and to protect the quality of water resources. The ODFW’s State of Oregon Wildlife Diversity Plan (Oregon Administrative Rule (OAR) 635-100-0080), Oregon Native Fish Conservation Policy (OAR 636-007-0502), and the Oregon Conservation Strategy (ODFW 2016) each provide protective measures for the conservation of native fish including the Borax Lake chub, which will remain to the best of our knowledge on the ODFW’s sensitive species list even when the species is removed from the Federal List. The Service is authorized to assist in the protection of fish and wildlife and their habitats under authorities provided by the Act (16 U.S.C. 1531 *et seq.*), the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742a–742j, not including 742 d-1).

Fourth, there is a practical reason to anticipate implementation of the CMP into the foreseeable future: the CMP actions are technically not complicated to implement, and costs are relatively low. We also have confidence the actions called for in the CMP will be effective in the future because they have already proven effective as evidenced by the information collected from recent actions and associated monitoring such as the annual downloading of air and water

temperature loggers at Borax Lake and conducting site evaluations consistent with the guidelines in the CMP.

Lastly, the Service, ODFW, and BLM collaboratively developed the Borax Lake chub CMP to outline individual agency roles and responsibilities, and commitments into the future, regarding Borax Lake chub, the Borax Lake ecosystem, and surrounding lands (USFWS *et al.* 2018). If an evaluation by the Service suggests the habitat and population are at risk, the Service will evaluate the need to again add the species to the List (i.e., “relist” the species) under the Act. Taken together, it is therefore reasonable to conclude that the CMP will be implemented as anticipated, and that the long-term recovery of the Borax Lake chub will be maintained and monitored adequately.

Downlisting Criteria

Downlisting Criterion 1: The presence of a naturally reproducing population of Borax Lake chub in Borax Lake that is free of exotic species

This criterion has been met. To be considered naturally reproducing, Borax Lake chub need to reproduce in their natural habitat in Borax Lake with no human intervention, such as supplementation with hatchery- or aquarium-raised fish. The Borax Lake chub population has never been supplemented with hatchery- or aquarium-raised fish and continues to reproduce naturally on an annual basis. In the 3 decades Borax Lake chub have been monitored, there has been only one documented occurrence of an exotic fish species. In 2013, an ODFW biologist observed a nonnative fish that was believed to be a bass given observed morphology (Scheerer *et al.* 2013, pp. 2–3, 9–10). Subsequent efforts to capture or observe this fish or other nonnative fishes were unsuccessful, and none has been seen in subsequent monitoring. The survival in

Borax Lake of this nonnative fish, or of any other commonly introduced nonnative fishes, is unlikely given the geothermally heated high water temperatures.

We consider this criterion met based on the lack of need for conservation actions supporting the species' reproductive success and the fact that only a single occurrence of a nonnative species has been documented. As noted above, we determined the likelihood of survival of this nonnative fish was low, and no observations or detections of this or other nonnative fishes have been made during subsequent surveys. See "Delisting Criterion 1" and *C. Disease or Predation* for additional discussion regarding the potential for exotic species introduction into Borax Lake.

Downlisting Criterion 2: Permanent protection for the 160-acre parcel of land surrounding and including Borax Lake (T37S, R33E, sec. 14) by TNC or other appropriate public resource agency

This criterion has been met. In 1983, TNC leased two 160-ac (65-ha) private land parcels, one surrounding Borax Lake and the other immediately to the north. In 1993, TNC acquired both parcels. TNC also acquired subsurface mineral rights to the land surrounding Borax Lake. TNC designated the land surrounding Borax Lake, and the 160-ac (65-ha) parcel to the north, as a preserve for the purpose of conserving the Borax Lake ecosystem. With the purchase of the two parcels by TNC, all lands designated as critical habitat for the Borax Lake chub are in public or conservation ownership. The diversion of water for irrigation and livestock grazing within designated critical habitat ceased. TNC no longer permits vehicular access to the preserve except for access for people with disabilities or for scientific research.

In addition to the above, in 1983, the BLM designated 520 ac (210 ha) of public land surrounding Borax Lake as an "area of critical environmental concern" (ACEC) to protect Borax

Lake chub and its habitat. In 2005, the record of decision for the resource management plan for the Andrews Resource Area added 80 ac (32 ha), for a total 600-ac (243-ha) Borax Lake ACEC (BLM 2005, p. 70). Following this designation, the area was fenced to exclude livestock from entering the ACEC and discourage grazing in the area, as closing critical habitat to livestock grazing was called for in the recovery plan in order to decrease disturbance to soils, marsh vegetation and outflow channels (USFWS 1987, pp. 4, 31, 39). The lake is now completely enclosed by fencing, including most of the 640 ac (259 ha) of designated critical habitat, except for a small portion that serves as a parking area for pedestrian access to the lake.

Downlisting Criterion 3: Removal of threats to subsurface waters from geothermal energy exploration or development

This criterion has been met. While this criterion does not identify a geographic area for which threats of geothermal energy exploration or development should be removed, the recovery plan's step-down outline and narrative describing recovery actions clearly identify this criterion as pertaining to Borax Lake and two 160-ac (65-ha) parcels of private land surrounding Borax Lake (USFWS 1987, pp. 30–45). These lands were eventually purchased by TNC and designated as critical habitat for Borax Lake chub, thereby removing the threat of geothermal development within close proximity to Borax Lake. Although the recovery plan did not explicitly call for removal of potential geothermal development threats outside of designated critical habitat, the Service has acknowledged that geothermal development outside critical habitat, but in proximity to Borax Lake, may constitute a potential threat (USFWS 2012, p. 24).

Numerous geologic studies have been conducted in the vicinity of Borax Lake, yet there is limited detailed information regarding the extent of the geothermal aquifer and the configuration of geothermal fluid flow pathways surrounding Borax Lake (Schneider and

McFarland 1995, entire; Fairley *et al.* 2003, entire; Fairley and Hinds 2004, pp. 827–828; Cummings 1995, pp. 12–19). As such, the best available scientific information does not allow us to determine the precise geographic distance over which geothermal development may represent a threat to the Borax Lake chub and the Borax Lake ecosystem. Given the lack of scientific information (*i.e.*, depth, extent, source of water, etc.) on the Borax Lake aquifer, a reasonable position is that geothermal development outside of critical habitat may represent a potential threat to Borax Lake chub and that the closer the development is to critical habitat, the greater the likelihood that development could affect the Borax Lake chub and the Borax Lake ecosystem.

With the passage of the Steens Mountain Cooperative Management and Protection Act of 2000 (Steens Act; 16 U.S.C. 460nnn *et seq.*) and the completion of the Steens Andrews Resource Management Plan (BLM 2005), the BLM has withdrawn the Alvord Known Geothermal Resource Area from mineral and geothermal exploration and development (BLM 2005a, p. 49). The Steens Act congressionally designated a “mineral withdrawal area” encompassing approximately 900,000 ac (364,217 ha) on BLM-administered lands. The mineral withdrawal area contains the majority of the Alvord Known Geothermal Resource Area (Alvord KGRA), including Borax Lake and surrounding public lands, with the exception of 332 ac (134 ha) of BLM-administered land located approximately 4.5 mi (7.2 km) from Borax Lake (BLM 2005a, p. I-2; BLM 2005b, p. 4).

Private lands within the vicinity of Borax Lake are not affected by the mineral withdrawal. Approximately 2,000 ac (809 ha) of privately owned lands occur within a radius of approximately 1 to 3 miles (mi) (1.6 to 4.8 kilometers (km)) from Borax Lake. Based on geothermal development investigated by various entities over the last 3 decades, it is reasonable

to assume that future geothermal development may be explored on private land in the vicinity of Borax Lake. However, as of 2018, there are no active proposals in place for such development.

The most recent exploration for geothermal resource development occurred in 2008, when the BLM received an inquiry from Pueblo Valley Geothermal LLC regarding permitting processes for geothermal exploratory drilling and the potential for developing a geothermal electrical generation plant in the Alvord Lake basin potentially within 3 to 5 mi (4.8 to 8.0 km) of Borax Lake. Pueblo Valley Geothermal LLC submitted a proposal to the BLM on January 31, 2012, for a binary geothermal plant that would produce 20 to 25 megawatts. Pueblo Valley Geothermal LLC also sought to acquire approximately 3,360 ac (1,360 ha) of BLM land via land exchange in order to develop their project. The BLM responded with a letter (Karges. 2012, pers. comm.) explaining that the BLM-managed lands surrounding the private lands under lease are part of the Leasable and Saleable mineral withdrawal enacted by the Steens Act and implemented under the Steens Mountain Cooperative Management and Protection Area Resource Management Plan. The BLM informed Pueblo Valley Geothermal LLC that they would not be able to complete an exchange for various reasons, including: (1) Difficulties in proposing and mitigating a project that would alter land designated as Visual Resource Management Class 2 (the visual resource management objective for class 2 is to retain the existing character of the landscape, and the level of change to the characteristic landscape should be low); (2) the lack of time and staffing to complete a feasibility analysis; and (3) the BLM's requirement that the exchange demonstrate a clear public benefit. The BLM suggested the best route would be to find a geothermal resource outside of the mineral withdrawal area and pursue exploration and development there. Pueblo Valley Geothermal LLC subsequently has become inactive and filed to dissolve their LLC status in the State of Oregon on December 26, 2013.

As stated previously, although the passage of the Steens Act designated a mineral withdrawal area on public lands surrounding Borax Lake, it does not include 322 ac (134 ha) of BLM-administered lands and 2,000 ac (809 ha) of private land located within a radius of approximately 1 to 4.5 mi (1.6 to 7.24 km) from Borax Lake. Therefore, while we view this criterion as having been met, we acknowledge there remains a potential for geothermal development on lands not formally withdrawn from geothermal or mineral development in the Alvord Basin and that future development of these resources constitutes a potential threat to Borax Lake chub. That said, we have determined the likelihood of this threat becoming operative in the foreseeable future is low.

See “Delisting Criterion 3” and *D. The Inadequacy of Existing Regulatory Mechanisms* for additional discussion regarding the threat of geothermal resource development.

Downlisting Criterion 4: Reestablishment of ponds and natural marshes adjacent to Borax Lake in order to create more chub habitat, and reestablishment of Lower Borax Lake by waters from Borax Lake in order to create more habitat

The intent of this criterion was to restore natural processes and maximize habitat for Borax Lake chub, and that has been accomplished. Although the reestablishment of Lower Borax Lake has not occurred, the Service determined subsequent to the development of the recovery plan that the reestablishment of the lake was not necessary for the recovery of the species. The 5-year review in 2012 (USFWS 2012, pp. 7, 26) concluded that Lower Borax Lake does not provide suitable habitat for Borax Lake chub due to desiccation during summers with low precipitation and to unsuitable habitat in the winter due to freezing. As a result, we no longer consider reestablishment of Lower Borax Lake to be a necessary action for Borax Lake chub recovery.

Numerous actions to maintain lake levels and restore natural outflows (and thereby reestablish ponds and natural marshes) have occurred at Borax Lake since the Borax Lake chub was listed. Beginning in 1983, TNC, with assistance from the BLM and the ODFW, repaired holes in the northern and eastern shorelines of the lake, and deepened the outflow channel on the southwestern shoreline to promote flow to Lower Borax Lake (USFWS 1987, p. 23). In 1984, the Service and TNC manually constructed several channels diverting water from the southwestern outflow channel into the adjacent marsh (USFWS 1987, p. 25). By 2003, there was no open-water connection between Borax Lake and Lower Borax Lake, but Lower Borax Lake did contain water at that time (Williams and Macdonald 2003, p. 7).

The only habitat outside of Borax Lake that provides habitat for Borax Lake chub is the wetland (referred to as “the marsh” in the 1982 listing rule (47 FR 43957; October 5, 1982)) to the south of Borax Lake, the overflow channel that connects the wetland to Borax Lake, and a second overflow channel on the northern end of the lake. Although the wetland at times maintains water year-round, water levels are variable and are influenced by a groundwater vent in the wetland and overflow from Borax Lake. The seasonal pattern and overall contribution of groundwater inputs to the wetland are not understood. In September 2015, the wetland was dry, due in part from reduced flow from Borax Lake caused by a vegetation plug in the overflow channel and presumably no or reduced contribution from groundwater. Later that fall, the wetland was observed to be full, presumably due to increased groundwater inputs. In response to the reduced flow in the overflow channel, the ODFW manually removed vegetation in spring 2016, to provide a more consistent flow through the overflow channel (Scheerer 2016, pers. comm.). Therefore, while groundwater inputs to the wetland are unpredictable, the increased flow through the overflow channel due to manual vegetation removal by the ODFW is

anticipated to increase the likelihood of maintaining habitat in the wetland for the Borax Lake chub. While the wetland and several overflow channels do not represent a large amount of habitat for the Borax Lake chub, they are potentially important cool-water refuge habitats during periods of above-average air temperatures when suitable cool-water habitat in Borax Lake may be reduced. An associated discussion can be found under “Delisting Criterion 1” and A. *The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range* in this final rule.

Delisting Criteria

In addition to the four downlisting criteria, the recovery plan also identified six additional criteria for delisting.

Delisting Criterion 1: A viable, self-sustaining population of Borax Lake chub, which is defined as a naturally sustaining population that is free of exotic species and fluctuates in size within the seasonal ranges observed in 1986 to 1987

This criterion has been met. Data collected from 1986 through 2019 show a self-sustaining population persists at Borax Lake. The population is naturally sustaining without the need for supplementation, such as propagation in a hatchery or in aquaria.

The Borax Lake chub is a species that demonstrates high annual variability in population abundance, ranging from a low of 1,242 estimated fish in 2015, to a high of 76,931 in 2017 (see table, below). As recently as 2010 and 2011, the population estimates were 25,489 and 26,571, respectively. The latest population estimate was 44,933 in 2019. Prior to 2015, the lowest population estimate was 4,132 in 1988. Such population variability, with opportunistic demographic resilience, is relatively common for small desert fishes (Winemiller 2005, pp. 878–879). In the case of the Borax Lake chub, population variation likely results from a combination

of factors including short life span, seasonal and annual variability in habitat conditions, and occurrence in water temperatures at the edge of the species’ thermal tolerance. Given our improved knowledge of natural variability as described above, we have concluded that the portion of this delisting criterion that called for population levels to fluctuate within the narrow range of population estimates conducted in 1986 and 1987 is unrealistic, and is no longer reasonable to maintain as a recovery goal for this species.

Table of population mark–recapture estimates for Borax Lake chub from 1986 to 2019, including adjusted Lincoln-Peterson and Huggins closed capture models.¹

Year²	Estimate	Lower 95% Confidence Limit	Upper 95% Confidence Limit
1986	15,276	13,672	17,068
1987	8,578	7,994	9,204
1988	4,132	3,720	4,589
1989	14,052	13,016	15,172
1990	19,165	18,117	20,273
1991	33,000	31,795	34,251
1992	25,255	24,170	26,388
1993	35,650	34,154	37,212
1994	13,421	12,537	14,368
1995	35,465	33,533	37,510
1996	8,259	7,451	9,153
1997	10,905	10,377	11,459
2005	14,680	12,585	17,120
2006	8,246	6,715	10,121
2007	9,384	7,461	11,793
2008	12,401	10,681	14,398
2009	14,115	12,793	15,573
2010	25,489	23,999	27,071
2011	26,571	24,949	28,301
2012	9,702	9,042	10,452
2015	1,242	1,077	1,456
2016	9,003	8,045	10,560
2017	76,931	68,444	86,952
2019	44,933	41,083	49,148

¹ Adjusted Lincoln-Peterson and Huggins closed capture models are referenced in Scheerer *et al.* 2012, p. 7. See Salzer 1992, p. 17; Salzer 1997, no pagination; Scheerer and Bangs 2011, p. 4; Scheerer *et al.* 2012, pp. 6–7; Scheerer *et al.* 2015, p. 3; Scheerer *et al.* 2016, p. 5; Meeuwig 2017, pers. comm.; Bangs 2019, pers. comm.

² Surveys were not conducted from 1998 to 2004, from 2013 to 2014, and in 2018.

Since the time of listing, two known mortality events occurred during periods when high air temperature and water coincided; during these events, maximum air and water temperatures exceeded 37 °C and 41 °C, respectively (Williams *et al.* 1989 p. 8-10, Scheerer *et al.* 2016, p. 9). Despite dramatic declines, population abundance quickly rebounded following these two mortality events. In the summer of 1987, a significant portion of larger adult fish were lost during a heat-related mortality event; however, juvenile fish were plentiful during a fall sampling event using fine meshed traps, leading researchers at the time to conclude that smaller fish were less susceptible to heat-related mortality (Williams *et al.* 1989, p. 14, Scopetone *et al.* 1995, p. 43). In later years, traps were used with larger mesh that did not allow researchers to capture juvenile fish. Between 2005 and 2016, ODFW noted a significant negative relationship between water temperature and population abundance (Scheerer *et al.* 2016, p. 9), noting the duration of days higher than the suggested thermal tolerance of the species. Daily maximum water temperatures recorded during this period often exceeded the suggested Borax Lake chub thermal tolerance by a wide margin (Scheerer *et al.* 2016, p. 7). However, in the summer of 2017, water temperature was higher than the suggested thermal tolerance for a longer duration than any period in the 2005–2016 record, although peak daily maximum temperatures were lower than some years (ODFW 2020, in prep). June-August maximum air temperatures were similar to maximum air temperatures observed during the mortality events observed in 1989 (NW Climate Toolbox). Rather than the expected results of a decline in population abundance, the estimated

population abundance in the fall of 2017 was twice as high as any previous estimate. Thus, while the 2015 estimate of 1,242 fish represents the lowest estimate on record, the pattern of variability observed over 3 decades of monitoring population abundance underscores the resiliency of this species and its ability to rebound quickly (see table, above).

With one exception, periodic surveys since 2005 have not identified any exotic species within Borax Lake (Scheerer and Jacobs 2005, 2006, 2007, 2008, 2009, and 2010; Scheerer and Bangs 2011; Scheerer *et al.* 2012, 2015, and 2016). However, in 2013, during shoreline surveys conducted by the ODFW, biologists noted a large fish with paired dorsal fins (presumably a bass) (Scheerer *et al.* 2013, p. 10). No additional sightings of the bass occurred during the ODFW surveys (Hurn 2014, pers. comm.) or during subsequent efforts to capture the bass (see *C. Disease or Predation*, below). Survival of the bass is believed to be unlikely given the high water temperatures in Borax Lake. No known occurrence of disease or predation affecting the population of Borax Lake chub has occurred since the time of listing (47 FR 43957; October 5, 1982). The best available scientific data indicate Borax Lake chub are a viable, self-sustaining population in habitat currently free from exotic species.

Delisting Criterion 2: Permanent protection for the 160-acre parcel of land to the north of Borax Lake (T37S, R33E, sec. 11) by TNC or other appropriate public resource agency

This criterion has been met. In 1983, TNC leased two 160-ac (65-ha) private land parcels, one surrounding Borax Lake and the other immediately to the north of the lake. TNC purchased these two parcels in 1993, placing both parcels in public or conservation ownership and protection.

Delisting Criterion 3: Withdrawal of Borax Lake waters from appropriations

This criterion has been met. With the acquisition of Borax Lake by TNC, surface waters on their land cannot be appropriated by others. Additionally, in 1991, the ODFW filed an application for the water rights to Borax Lake for conservation purposes. The water right was certified and issued to the Oregon Water Resources Department on December 16, 1998, for the purpose of providing habitat for the Borax Lake chub (OWRD 1998, entire).

Delisting Criterion 4: Establishment of a fence around the 640-acre critical habitat area to prevent vehicle entry

This criterion has been mostly met. The Andrews/Steens Resource Area, Burns District BLM, has constructed facilities to modify public access and enhance public understanding of the Borax Lake area. The Burns District BLM closed access roads in the vicinity of Borax Lake, realigned the fence surrounding Borax Lake to limit vehicle access, and designated visitor parking. Partial funding for the fencing project came from the BLM's Threatened and Endangered Species Recovery Fund, an initiative started in 2010 that supports projects targeting key recovery actions for federally listed and candidate species occurring on BLM lands. The BLM plans to install interpretive signs at the designated parking area (USFWS *et al.* 2018, p. 7). The lake is now completely enclosed by fencing, although approximately 30 ac (12 ha) of critical habitat remains outside the fenced portion of the critical habitat, leaving approximately 0.6 mi (1 km) of road accessible to vehicles within designated critical habitat. The remaining area of the critical habitat will remain unfenced to provide for vehicle access, parking, and interpretative signs, while still protecting the Borax Lake environment. The BLM and ODFW will continue to assess the effectiveness of the vehicle closure for protection of the Borax Lake area. Barring any new information indicating that the existing fencing is insufficient to protect the Borax Lake chub, fencing of the remaining critical habitat appears to be unnecessary.

Delisting Criterion 5: Establishment of monitoring programs to survey habitats and fish population status

This criterion has been met. Numerous studies of the ecology and habitat of Borax Lake have been conducted (Salzer 1992; Scopettone *et al.* 1995; Furnish *et al.* 2002; Scheerer and Jacobs 2005, 2006, 2007, 2008, 2009, 2010; Scheerer and Bangs 2011; Scheerer *et al.* 2012, 2013). TNC conducted abundance estimates from 1986 through 1997. The ODFW conducted mark-recapture population surveys from 2005 through 2012, and again in 2015 and 2016; developed a survey protocol; and recommended a long-term monitoring strategy (Scheerer and Jacobs 2005, 2006, 2007, 2008, 2009, 2010; Scheerer and Bangs 2011; Scheerer *et al.* 2012, 2013, 2015, 2016). The ODFW also conducted surveys to monitor the condition of the lake shoreline, outflows, and adjacent wetlands. Additional physical data, including hydrologic information, substrate mapping, outflow monitoring, tracking of water levels, and geological and slope stability, were gathered in the 1990s (Scopettone *et al.* 1995; Wilson 2000).

Following delisting, the Borax Lake chub post delisting monitoring (PDM) plan will facilitate the implementation of annual monitoring, except for surveys to estimate population abundance, which will be conducted once every 3 years over a 10-year period (four population surveys total), which will begin following the effective date of this rule (see **DATES**, above). Given the Borax Lake chub is a short-lived fish (few survive beyond 1 year; Scopettone *et al.* 1995, p. 36), periodic monitoring over this time period will allow us to address any possible negative effects to the Borax Lake chub. Additionally, the chub experienced wide fluctuation in its population year-to-year. Limited point estimates for a widely fluctuating population can lead to difficulty assessing long-term trends. Therefore, although the minimum PDM period required by the Act is 5 years, as described above, we chose to extend the population abundance

monitoring cycle to once every 3 years and the total monitoring period to 10 years to ensure we can accurately measure changes in trends.

Furthermore, with the understanding that the Borax Lake chub is a conservation-reliant species, the BLM, ODFW, and Service developed a CMP (USFWS *et al.* 2018) that outlines long-term management actions necessary to provide for the continued persistence of habitats important to Borax Lake chub. The CMP was agreed to, finalized, and signed by the BLM, ODFW, and Service in June 2018. The cooperating parties committed to the following monitoring actions: (1) Borax Lake chub population monitoring; (2) habitat and shoreline monitoring; (3) water temperature monitoring and assessment of potential impacts from climate change; and (4) lake-level monitoring and management to assure ODFW's water right is maintained (USFWS *et al.* 2018, p. 1). The CMP has no termination date. While the CMP provides agency commitments for long-term stewardship of Borax Lake and Borax Lake chub, the CMP is a voluntary agreement, and delisting is not dependent upon implementation of the actions described in the CMP.

Delisting Criterion 6: Lack of any new threats to the species or ecosystem for 5 consecutive years

This criterion has been met. Although this final rule identifies climate change as a new potential stressor in the future, we have determined it is not operative on the species or its habitat currently, and is not anticipated to negatively affect the species in the foreseeable future.

Increases in ambient air temperatures have caused impacts to Borax Lake chub when they coincided with periods of elevated temperatures from the geothermal inflow to the lake. The frequency of these impacts may potentially increase in the future. Subsequent to the publication of the proposed rule to delist Borax Lake chub (84 FR 6110; February 26, 2019), additional

analyses of available 2017 data were conducted that resulted in a slightly modified interpretation (from that presented in the proposed rule) of the relationship between air and water temperature (ODFW 2020, in prep). The new analyses indicate that increased air temperature may slow the cooling of the geothermal waters at Borax Lake, and we anticipate that thermal refuge associated with shallow margin habitat and cool and cold water vents in the lake, along with the species' ability to rebound quickly following periods of elevated water temperatures, will provide resilience against any future potential effects of climate change. See our discussion under A. *The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*, below, for a more detailed description on potential effects of climate change.

Summary of Changes from the Proposed Rule and Draft PDM Plan

We considered all comments and information we received during the comment period for the proposed rule to delist Borax Lake chub (84 FR 6110; February 26, 2019). This resulted in the following changes from the proposed rule in this final rule:

- We made minor editorial changes and reorganized various sections of the rule to increase readability.
- We conducted additional analyses of available climate information.
- We revisited and reanalyzed available species life-history information along with air and water temperature data.
- We added additional details regarding the PDM and Borax Lake chub CMP.

This also resulted in the following changes to the PDM plan:

- We modified and extended the PDM from 5 years to 10 years and increased the frequency and type of information scheduled to be collected in order to increase our ability to detect changes in habitat or population abundance that may be attributed to climate change.

- We assessed the opportunities for a second population. Based in part on concerns expressed by public and peer reviewers regarding potential impacts of climate change, we determined establishing a secondary refuge population of Borax Lake chub through translocation would increase population redundancy, and spread risk inherent to any naturally rare or endemic species. Therefore, in addition to monitoring Borax Lake, the Service and our partners will evaluate the feasibility of establishing a secondary refuge population of Borax Lake chub at a yet-to-be-determined location in the Alvord Basin during the PDM period as a long-term conservation measure for the species. Although the species does not require this action to persist long-term, establishment of a secondary refuge population would provide additional assurance and conservations benefits. Similar steps have been taken for other naturally rare or endemic species.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for listing species, reclassifying species on the List, or removing species from listed status. “Species” is defined by the Act as including any species or subspecies of fish or wildlife or plants, and any distinct vertebrate population segment of fish or wildlife that interbreeds when mature (16 U.S.C. 1532(16)). The Act defines an endangered species as a species that is “in danger of extinction throughout all or a significant portion of its range,” and a threatened species as a species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether any species is an “endangered species” or a “threatened species” because of any of the following factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or

range;

- (B) Overutilization for commercial, recreational, scientific, or educational purposes;
- (C) Disease or predation;
- (D) The inadequacy of existing regulatory mechanisms; or
- (E) Other natural or manmade factors affecting its continued existence.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative

effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

We must consider these same five factors in delisting a species. We may delist a species according to 50 CFR 424.11(e) if the best available scientific and commercial data indicate that: (1) The species is extinct; (2) the species does not meet the definition of an endangered or a threatened species; or (3) the listed entity does not meet the statutory definition of a species.

A recovered species is one that no longer meets the Act’s definition of endangered or threatened. For species that are already listed as endangered or threatened, this analysis of threats is an evaluation of both the threats currently facing the species and the threats that are reasonably likely to affect the species in the foreseeable future following delisting or downlisting (*i.e.*, reclassification from endangered to threatened) and the removal or reduction of the Act’s protections.

The Act does not define the term “foreseeable future.” Our proposed rule described “foreseeable future” as the extent to which we can reasonably rely on predictions about the future in making determinations about the future conservation status of the species. The Service since codified its understanding of foreseeable future in 50 CFR 424.11(d) (84 FR 45020). In those regulations, we explain the term “foreseeable future” extends only so far into the future as the Service can reasonably determine that both the future threats and the species’ responses to those threats are likely. The Service will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species’ life-

history characteristics, threat-projection timeframes, and environmental variability. The Service need not identify the foreseeable future in terms of a specific period of time. These regulations did not significantly modify the Service's interpretation; rather they codified a framework that sets forth how the Service will determine what constitutes the foreseeable future based on our long-standing practice. Accordingly, though regulations do not apply to the final rule for the Borax Lake chub because it was proposed prior to their effective date, they do not change the Service's assessment of foreseeable future for the Borax Lake chub as contained in our proposed rule and in this final rule. We think it is reasonable to define the foreseeable future for Borax Lake chub to be a range of 20 to 30 years based on the following analysis. In considering the foreseeable future as it relates to the status of the Borax Lake chub, we consider the factors affecting the species, historical abundance trends, and ongoing conservation efforts. Our period of record for monitoring the Borax Lake chub and its associated habitat extends back more than 30 years, which, when combined with our knowledge of factors affecting the species, allows us to reasonably predict future conditions, albeit with diminishing precision over time. We also expect the ODFW, BLM, and TNC to continue to manage Borax Lake and to conserve Borax Lake chub. This expectation is based on both the fact that for over 3 decades, the ODFW, BLM, and TNC have taken actions benefiting the Borax Lake chub and the Borax Lake ecosystem, as well as the lack of termination date on the CMP signed by the three entities that facilitates conservation for the Borax Lake chub into the future. Furthermore, ODFW's water right for Borax Lake that protects water levels for the Borax Lake chub is held in perpetuity (OWRD 1998, entire). Finally, as discussed below, our understanding of the potential future effects of climate change on Borax Lake chub and its habitat is based on downscaled climate change

projections that extend out approximately 30 years, to the year 2049 (Alder and Hostetler 2016, entire).

In examining threats to narrowly distributed endemic species such as the Borax Lake chub, we must consider that natural rarity (*i.e.*, a species that only exists in one or a few locations, though it may be abundant there), in and of itself, does not constitute a threat under the Act. Natural rarity may increase risk or vulnerability if threats are operative on the species or its habitat now or in the foreseeable future, but rarity, in and of itself, does not constitute a threat under the Act.

In the following analysis, we evaluate the status of the Borax Lake chub through the five-factor analysis of threats currently affecting the species, or that are likely to affect the species within the foreseeable future.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

At the time of listing in 1982 (47 FR 43957; October 5, 1982), the primary threats to the Borax Lake chub consisted of potential impacts from geothermal energy development on BLM and private lands near Borax Lake, diversion of the lake's outflows by alteration of the shoreline crust, and potential development of a recreation facility. Since the time of listing, actions have been taken to reduce or eliminate these threats, as discussed below. We also include an analysis of the effects of climate change as a potential threat to habitat in the foreseeable future.

Recreation, Water Diversion, and Shoreline Habitat Alteration

The recreation facility discussed in the 1982 listing rule was never developed, and acquisition of the property by TNC eliminated the potential for development of a recreation facility at the Borax Lake site (Williams and Macdonald 2003, p. 12).

The ODFW filed for water rights at Borax Lake in 1991, and that water right is now certified and held in trust by the Oregon Water Resources Department (OWRD 1998, entire), to prevent further attempts at diverting the water and to ensure maintenance of the water elevation in Borax Lake (see “Delisting Criterion 3” discussion, above). The purpose of the water right is to provide the required habitat conditions for Borax Lake chub. The right is established under Oregon Revised Statute 537.341, with a priority date of August 21, 1991. The right is limited to the amount of water necessary to maintain a surface water elevation of 4,081 ft (1,244 m) above mean sea level. The certificate will remain in place in perpetuity. The certificate does not need beneficial use (i.e., actively used) every 5 years like many other water right certificates. As long as Borax Lake chub exist in Borax Lake, the use is being applied as intended in the water right (J. Anthony 2020, pers. comm.). The right has been recorded in the State record of Water Right Certificates as 75919 (OWRD 1998, entire).

The 160-ac (65-ha) private land parcel containing Borax Lake was purchased by TNC in 1993 (Williams and McDonald 2003, p. 2). Subsurface mineral rights are included. Since TNC acquisition, surface waters on their land, upon which Borax Lake is located, can no longer be appropriated by others. Additionally, TNC ended the practice of actively diverting surface water from the eastern side of the lake to reduce the impact from prior water diversions (Williams and McDonald 2003, p. 7). The BLM designated the adjacent 600 ac (243 ha) of public lands as an ACEC for the conservation of Borax Lake chub, and the area was fenced to exclude livestock from entering the ACEC (see “Downlisting Criterion 2” discussion, above; BLM 2005a, p. 70).

Off-road vehicle damage along the lake shoreline has been documented in the past (Scheerer and Jacobs 2005, p. 6; 2006, p. 7; 2007, p. 6; 2008, p. 6; 2009, p. 8; 2010, p. 4; Scheerer and Bangs 2011, p. 9; Scheerer *et al.* 2012, p. 13; Scheerer *et al.* 2013, p. 6). As a

result, in 2011, the BLM and TNC completed fencing the remaining perimeter of the lake and most of the associated critical habitat to exclude unauthorized vehicles (Scheerer and Bangs 2011, p. 11), and in 2013, they installed locks on all access gates (Scheerer *et al.* 2013, pp. 9–10). Due to the completion of the perimeter fence, the threat to Borax Lake chub and its habitat from shoreline habitat alteration by vehicles has been addressed.

Geothermal Development

Geothermal exploration and development has been pursued in the Alvord Known Geothermal Resource Area and specifically in the vicinity of Borax Lake from the early 1970s (Wassinger and Koza 1980, p. 1) to 2013. The Alvord Known Geothermal Resource Area is a 176,835-ac (71,563-ha) area within the Alvord Basin (Wassinger and Koza 1980, p. 7).

Development of geothermal resources was considered in 1980, and exploratory wells were drilled in 1982 (47 FR 43957; October 5, 1982). In 1994, Anadarko proposed additional geothermal exploration and development, and the BLM prepared a notice of intent to prepare an environmental impact statement (EIS). After receiving public scoping comments, Anadarko withdrew its development proposal, and no EIS was written (Geisler 2009, pers. comm.).

The passage of the Steens Act in 2000, and the finalization of the BLM resource management plan (RMP) (BLM 2005a, p. 71), withdrew mineral and geothermal resources from development on Federal lands within the Alvord Known Geothermal Resource Area. The BLM retained 332 ac (134 ha) of land with high potential for geothermal resources west of Fields and within 4.5 mi (7.2 km) of Borax Lake open for leasable mineral and geothermal development (BLM 2005a, p. I-2). Private lands within this area are not affected by the mineral withdrawal.

In 2008, the BLM and DOGAMI received inquiries on behalf of private landowners in Alvord Basin regarding the development of geothermal resources. The BLM was contacted

regarding electrical transmission and right-of-way (ROW) access to cross BLM lands in order to explore and develop commercial geothermal electrical power (Bird 2008, pers. comm.). The developer, Pueblo Valley Geothermal LLC, met with the BLM in 2008, to discuss their interest in obtaining an ROW permit to access private land and construct a power plant. Although the Steens Act and subsequent RMP withdrew the Alvord Known Geothermal Resource Area from geothermal development, the RMP could allow an ROW permit because the area in question is not within the Cooperative Management and Protection Area boundary. ROWs are a valid use of public lands under sections 302 and 501 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*), as amended (BLM 2005a, p. 59). The BLM would be responsible under the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*) to analyze any proposed ROW project, including the connected actions, such as exploratory well drilling and power line construction.

The proposed power plant was anticipated to generate 1 to 10 megawatts (Hall 2011, pers. comm.). Pueblo Valley Geothermal LLC acquired a 53-year lease on approximately 2,000 ac (809 ha) from landowners located south of Alvord Lake, and within 3 mi (4.8 km) and as close as 1 mi (1.6 km) from Borax Lake (Hall 2009, pers. comm.). Pueblo Valley Geothermal LLC also placed an advertisement in the publication “Geothermal Energy Weekly” seeking investors for a 20- to 25-megawatt geothermal facility (Geothermal Energy Association 2010, no pagination). The developer indicated in 2011 that they were progressing with resource assessments regarding the total megawatt and economic potential (Hall 2011, pers. comm.). No formal permit applications were received by the BLM or DOGAMI in 2011 (Houston 2008, pers. comm.; Houston 2010, pers. comm.; Houston 2011, pers. comm.), and as of 2018, we are not aware of any such applications.

Pueblo Valley Geothermal LLC submitted an informal proposal to the BLM on January 31, 2012, seeking to acquire 3,360 ac (1,360 ha) of BLM land in the vicinity of the Borax Lake geothermal aquifer in the interest of developing an air-cooled binary geothermal plant to produce 20 to 25 megawatts of electricity (McLain 2012, pers. comm.). The BLM responded with a letter on March 14, 2012, explaining that due to various reasons including resource concerns, funding, and staffing priorities, such a land exchange was not feasible at that time (Karges 2012, pers. comm.). Pueblo Valley Geothermal LLC indicated to us that the proposal to develop geothermal energy on private land in the vicinity of Borax Lake was not active (Hall 2014, pers. comm.). The Oregon Secretary of State Office maintains an online business registry of Limited Liability Company (LLC) companies (Oregon Secretary of State 2019). The list was consulted, and we found that the company, Pueblo Valley Geothermal LLC, filed an article of dissolution on December 26, 2013. A review of the Harney County Assessor's property records show that 320 ac (129 ha) of land previously leased by Pueblo Valley LLC, which is approximately 1 mi (1.6 km) west of Borax Lake, is now owned by Oregon Geothermal LLC. We do not have any new information on permit applications from Oregon Geothermal LLC or any other new geothermal proposals that may arise in the foreseeable future.

Potential impacts resulting from geothermal development that were identified at the time of listing include effects to water elevation in Borax Lake due to the interconnecting aquifers or springs. Drilling could disrupt the hot water aquifer that supplies Borax Lake. Potential impacts from geothermal energy drilling could include changes to the aquifer pressure or temperature, and the potential to lessen or eliminate inflows to the lake from the geothermal aquifer. Changes to water flow and water temperature may have an adverse impact on the Borax Lake chub.

Although the species tolerates thermal waters, excessive warming of the lake's water could cause adverse physiological effects, and, at extremes, would be lethal to the Borax Lake chub.

In summary, proposals to develop geothermal energy resources in the Borax Lake vicinity have occurred sporadically in the 1970s, in the 1980s, in 1994, and in 2008 through 2012. However, none of these proposals has moved forward with permitting and implementation over a 4-decade period, and this history leads us to conclude that the likelihood of geothermal energy development now and in the foreseeable future is low. Furthermore, while geothermal development in the vicinity of Borax Lake is considered a potential threat to the Borax Lake chub, the precise effects of possible geothermal development on the species are uncertain and unpredictable. The potential effects to the species would depend upon the specifics, such as the scale of the project and proximity to Borax Lake, of any geothermal energy development that might proceed to the implementation phase. Depending on the particular circumstances of any particular project, such development could potentially have a negative effect on the species, or it might have no or negligible effects. The effects of any future geothermal project proposal on Borax Lake chub would be assessed based on specific project details and other data available at the time. If an assessment suggested a future geothermal project would likely cause significant risk to Borax Lake and the well-being of Borax Lake chub, and existing regulatory mechanisms did not deter or result in modifications to the development to minimize or eliminate likelihood of impacts to the chub, we have the discretion to use the emergency listing authorities under section 4(b)(7) of the Act, such as we used in the May 28, 1980, emergency listing of Borax Lake chub (45 FR 35821). The possibility of geothermal development in the vicinity of Borax Lake will continue to represent a potential threat to Borax Lake chub and its habitat, but we have determined the likelihood of this threat becoming operative in the foreseeable future is low.

Effects of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) concluded that the evidence for warming of the global climate system is unequivocal (IPCC 2013, p. 3). Numerous long-term climate changes have been observed including changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns, and aspects of extreme weather including droughts, heavy precipitation, and heat waves (IPCC 2013, p. 4). The general climate trend for North America includes increases in mean annual temperatures and precipitation and the increased likelihood of extreme weather events by the mid-21st century (IPCC 2014, pp. 1452–1456). Changes in climate can have direct or indirect effects on species; may be positive, neutral, or negative; and may change over time, depending on the species and other relevant considerations such as the effects of interactions of climate with other variables (*e.g.*, habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19).

Global climate projections are informative and, in some cases, the only or the best scientific information available for us to use. However, projected changes in climate and related impacts can vary substantially across and within different regions of the world (*e.g.*, IPCC 2007, pp. 8–12). Therefore, we use “downscaled” projections when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species (see Glick *et al.* 2011, pp. 58–61, for a discussion of downscaling).

Downscaled projections as of 2016 were available for our analysis from the U.S. Geological Survey (Alder and Hostetler 2016, entire). The National Climate Change Viewer is based on the mean of 30 models, which can be used to predict changes in air temperature and precipitation for the Alvord Lake basin in Harney County, Oregon, based on two emission

scenarios, RCP4.5 and RCP8.5. Scenario RCP4.5 is a moderate emissions scenario (where atmospheric concentrations of greenhouse gases are expected to equal approximately 650 parts per million (ppm) after the year 2100), and RCP8.5 is the most aggressive emissions scenario (in which greenhouse gases continue to rise unchecked through the end of the century) (Alder and Hostetler 2016, entire).

With regard to our analysis for the Borax Lake chub, we used both the RCP8.5 and RCP4.5 emission scenarios to evaluate projected air temperature increases. Given the timeframe of our analysis (through 2049), both models predicted similar temperature projections. The RCP8.5 emissions scenario predicted that during the period from 2025 to 2049, the July mean model maximum air temperature will increase by 2.4 °C (4.3 °F) from the historical mean as compared to projected increase of 1.9 °C (3.3 °F) under the RCP4.5 emissions scenario. The models predict very little change in the mean annual precipitation and runoff for the Alvord Lake basin (Alder and Hostetler 2016, entire).

The relationship between air temperature, water temperature, and habitat suitability at Borax Lake is highly dynamic and not fully understood. As a geothermal hot spring, water temperatures at Borax Lake are likely influenced by the temperature and the rate of outflow from the primary hot water vent and the other secondary cool water vents, ephemeral thermoclines between areas with relatively cool and warm water, and wind direction and velocity. A seasonal component exists in both the magnitude and temperature of inflow from the main spring vent, and these relationships are correlated with seasonal runoff in the Alvord Basin (Cummings *et al.* 1993, p. 120) and seasonal air temperature (Williams *et al.* 1989, p. 16). Water temperature from the main vent can vary from 40 to 148 °C (104 to 298 °F; Perkins *et al.* 1996, p. 2), and air temperature likely reduces the water temperature at the surface of the lake.

The effects that future increases in air temperature may have on Borax Lake water temperatures is unknown. Although surface water at the lake appears to be cooled by the air, an increase in air temperature does not necessarily correspond to an increase in water temperatures at Borax Lake over a short-term time scale as other factors may impact lake temperature, including wind, temperature of water from the vent, and ephemeral thermoclines (Perkins *et al.* 1996, p. 15). Climate change predictions for the region show an increase in wind velocity, but the uncertainty surrounding the relationship between wind velocity, air temperature, and water temperature prevent predictions on the effects of such an increase on the temperature of Borax Lake. Currently, water temperatures often exceed the suggested (Williams and Bond 1983, p. 412) thermal maximum of the species by a wide margin.

The lake experiences high spatial variability in water temperatures, caused in part by multiple small cold and cool water vents, besides the main vent. Borax Lake chub seek out relatively cooler water during high temperature events (Williams *et al.* 1989, p. 17). However, water temperature has periodically exceeded the suggested thermal tolerance of the species across all monitoring locations. Since the time of listing, two known mortality events occurred during periods when high air and water temperature coincided. Although the abundance declines associated with these events were substantial, the population quickly rebounded. Water temperature monitoring between 2005 and 2016 showed a potential negative relationship between abundance and water temperature. However, in the summer of 2017, water temperature was higher than the suggested thermal tolerance for a longer duration than any period in the 2005–2016 record, although peak daily maximum temperatures were lower than some years (ODFW 2020, in prep). June-August maximum air temperatures were similar to maximum air temperatures observed during the mortality events observed in 1989 (Alder and Hostetler 2019,

unpaginated). Rather than the expected results of a decline in population abundance, the estimated population abundance in the fall of 2017 was twice as high as any previous estimate.

Borax Lake chub may be adapted to thermal tolerance, and suggested that annual progressive acclimation to increased temperature may aid survival during periods of high temperature (Williams *et al.* 1989, p. 17). Smaller fish appear to be less susceptible to heat-related mortality (Williams *et al.* 1989, p. 14). The rapid maturity of juvenile fish and prolonged spawning period (Williams and Bond 1983, p. 413; Scopetone *et al.* 1995, p. 41; Perkins *et al.* 1996, p. 18) may enable successful spawning during consecutive hot years, even if the population of larger, and presumably older, fish is reduced.

Although a specific analysis has not been conducted to determine the amount and suitability of thermal refuge habitat that may be available under various lake and air temperature conditions, the availability of shallow margin habitat around the perimeter of the lake, along with the outflow channel and wetland, likely provides thermal refuge (*i.e.*, cooler water) habitat for the species during periods when warm air and water temperatures coincide (Scheerer and Bangs 2011, pp. 5–8; Scheerer *et al.* 2012, pp. 7–11). In addition, cool and cold water vents within portions of the lake that likely contribute to moderating lake temperatures and provide additional areas of thermal refuge (Scheerer 2018, pers. comm.). While there is evidence these cool and cold water vents, as well as warm and hot vents within the lake (in addition to the primary vent) vary in temperature year to year, the aggregate of these thermal refuge habitats, along with the species' ability to rebound quickly following periods of higher than normal air and water temperatures, are anticipated to provide resilience against potential future effects of climate change.

Although there are no currently available climate projections on the persistence of springs into the future, changes to precipitation, drought, aquifer recharge, or vegetative community around Borax Lake as a result of climate change would not likely have an impact on the Borax Lake chub. Borax Lake is perched above the valley floor, there is no inflow of water from above-ground sources, and the vegetative community is not likely to change due to the temperature increases predicted.

Summary of Factor A

Since the time of listing in 1982 (47 FR 43957; October 5, 1982), actions have been taken to reduce or eliminate the destruction and modification of Borax Lake chub habitat. This includes the acquisition of Borax Lake and surrounding lands by TNC, the BLM's designation of adjacent lands as an ACEC, protection of subsurface and surface waters, protection from mineral withdrawal, and closure of fragile lands to livestock grazing and unauthorized vehicle access. Although these measures have removed and minimized various threats to Borax Lake and surrounding lands, the potential for geothermal development, and consequent possible impacts to Borax Lake chub and its habitat, remains. The possibility of geothermal development in the vicinity of Borax Lake will continue to represent a potential threat to Borax Lake chub and its habitat, but we have determined the likelihood of this threat becoming operative in the foreseeable future is low.

Increases in the ambient air temperature from climate change could slow the cooling of the geothermal waters in Borax Lake. Cooling of the waters of Borax Lake, especially the shallow margin areas including several overflow channels and the wetland, is important to the Borax Lake chub during warm times of the year given that temperatures in some areas of the

lake often exceed the thermal maximum for this species (Scheerer and Bangs 2011, p. 8) reported as 34.5 °C (94 °F) (Williams and Bond 1983, p. 412).

Two previous mortality events were observed following periods when high water temperature and air temperature coincided. It is reasonable to assume the frequency of these events due to climate change may increase such that there is a possibility for consecutive year events of adult population abundance decline associated with abnormally warm air and water temperatures. We anticipate that thermal refuge associated with shallow margin habitat and cool and cold water vents in the lake, along with the species' ability to rebound quickly following periods of higher than normal air and water temperatures, will provide resilience against potential future effects of climate change.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization for commercial, recreational, scientific, or educational purposes was not a factor in listing (47 FR 43957; October 5, 1982) and is currently not known to be a threat to the Borax Lake chub, nor is it likely to become so in the foreseeable future.

C. Disease or Predation

Disease was not a factor in listing of the Borax Lake chub (47 FR 43957; October 5, 1982) and is currently not known to be a threat to Borax Lake chub, nor is it likely to become so in the foreseeable future.

Likewise, predation was not noted as a factor in the listing of Borax Lake chub (47 FR 43957; October 5, 1982). Several native species that are likely predators of the Borax Lake chub, such as garter snakes and common grebes, are found in and around Borax Lake. The Borax Lake chub evolved in this habitat in the presence of these predatory species, and the species has persisted in the presence of these predators. Although we do not believe predation is

a threat currently or in the foreseeable future, a single observation of an exotic fish did occur in 2013 (see “Delisting Criterion 1,” above, for more discussion). Exotic fish were not observed in repeated surveys, and no known impacts to Borax Lake chub occurred. The high water temperatures and water chemistry in Borax Lake, which likely limited the long-term survival of this exotic fish, also limit the overall likelihood of establishment of exotic species in Borax Lake. The establishment of a perimeter fence around Borax Lake by the BLM and TNC in 2011 further reduced the likelihood of purposeful or accidental introductions of exotic species to the extent that we conclude that the threat of predation has been addressed.

As noted previously in this rule, the BLM, ODFW, and the Service developed a CMP that will guide future monitoring for nonnative species, monitoring of Borax Lake chub, vehicle access restrictions, and public outreach and education (USFWS *et al.* 2018). While the CMP provides agency commitments for long-term stewardship of Borax Lake and Borax Lake chub, this delisting is not dependent upon implementation of the actions described in the CMP.

D. The Inadequacy of Existing Regulatory Mechanisms

Under this factor, we examine the stressors identified within the other factors as ameliorated or exacerbated by any existing regulatory mechanisms or conservation efforts. Section 4(b)(1)(A) of the Act requires that the Service take into account “those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species.” In relation to Factor D under the Act, we interpret this language to require the Service to consider relevant Federal, State, and Tribal laws, regulations, and other such binding legal mechanisms that may ameliorate or exacerbate any of the threats we describe in threat analyses under the other four factors or otherwise enhance the species’ conservation. Our consideration of these mechanisms is described in detail within each of the

threats or stressors to the species (see full discussion under this section, **Summary of Factors Affecting the Species**). For currently listed species that are being considered for delisting, we consider the adequacy of existing regulatory mechanisms to address threats to the species absent the protections of the Act. We examine whether other regulatory mechanisms would remain in place if the species were delisted, and the extent to which those mechanisms will continue to help ensure that future threats will be reduced or minimized.

The following provides an overview of the existing regulatory protections that protect the Borax Lake ecosystem and Borax Lake chub.

The Nature Conservancy

The 160-ac (65-ha) private land parcel containing Borax Lake and the 160-ac (65-ha) parcel to the north of the lake were purchased by TNC in 1993. Subsurface mineral rights are included in the deed. Since TNC acquisition, surface waters on their land, upon which Borax Lake is located, can no longer be appropriated by others. Additionally, TNC ended the practice of actively diverting surface water from the eastern side of the lake to reduce the impact from prior water diversions.

BLM—Federal Land and Rights-of-Way

The passage of the Steens Act of 2000 and the completion of the Steens Andrews RMP withdrew the Alvord KGRA from mineral and geothermal exploration and development (BLM 2005a). The Steens Act congressionally designated a mineral withdrawal area encompassing 900,000 ac (364,217.1 ha) of the planning area on BLM-administered lands. The mineral withdrawal area contains the majority of the Alvord KGRA, including Borax Lake and surrounding public lands, with the exception of 332 ac (134.4 ha) located approximately 4.5 mi (7.242 km) from Borax Lake (BLM 2005a). Private lands within this area are not affected by the

mineral withdrawal. Approximately 2,000 ac (809.4 ha) of privately owned land occur within a 3-mi (4.83-km) radius of Borax Lake and are not subject to BLM's withdrawal. The BLM has responsibility to review all applications for geothermal development within the Alvord KGRA that occur on BLM lands and some applications for development on private lands if the development requires an ROW for access or transmission lines across BLM-managed lands. ROWs are a valid use of public lands under sections 302 and 501 of the Federal Land Policy and Management Act of 1976 (BLM 2005a). The BLM would be responsible under the National Environmental Policy Act to analyze the environmental impacts of any proposed ROW project including the connected action (*i.e.*, energy development on private lands). By seeking an ROW, the development of geothermal energy or mineral withdrawal on private lands would be subject to consultation. All the private land in proximity to Borax Lake is surrounded by BLM land; thus any development on these private lands would require a BLM ROW to move energy out of the development area. The application for an ROW would trigger consultation with the Service, and therefore potential impacts of the development to Borax Lake chub would be assessed.

In 1983, the BLM designated 520 ac (210 ha) of public land surrounding Borax Lake as an ACEC to protect Borax Lake chub and its habitat. In 2005, the record of decision for the RMP for the Andrews Resource Area added 80 ac (32 ha), for a total 600-ac (243-ha) Borax Lake ACEC (BLM 2005a, p. 70). Despite being delisted, the Borax Lake chub still meets the BLM's special status species criteria and thus the ACEC will still meet all ACEC designation criteria. While an ACEC designation can be removed or modified through a land and resource management plan (RMP) update, the Burns District currently has no plans to modify the boundary or change the ACEC in any way (M. Anthony 2020, pers. comm.).

Off-road vehicle damage along the lake shoreline was documented in the past (Scheerer and Jacobs 2005, p. 6; 2006, p. 7; 2007, p. 6; 2008, p. 6; 2009, p. 8; 2010, p. 4; Scheerer and Bangs 2011, p. 9; Scheerer *et al.* 2012, p. 13; Scheerer *et al.* 2013, p. 6). As a result, in 2011, the BLM and TNC completed a perimeter fence surrounding the lake and most of the associated critical habitat to exclude unauthorized vehicles, and in 2013, they installed locks on all access gates. Due to the completion of the perimeter fence, the threat to the Borax lake chub from shoreline habitat alteration by vehicles has been addressed.

State of Oregon, Department of Geology and Mineral Industries (DOGAMI)

Oregon Revised Statute (ORS) chapter 522 authorizes DOGAMI to control drilling, re-drilling, and deepening of wells in Oregon for the discovery and production of geothermal resources. Under this authority, a developer undertaking geothermal exploration on all land (public and private) must first obtain a permit from DOGAMI (Oregon Administrative Rule (OAR) 632-020-0028). DOGAMI process requires circulation of any permit application to other State agencies that manage natural resources such as the Water Resources Department, ODFW, Department of Environmental Quality, State Parks and Recreation Department, Department of Land Conservation and Development, Department of State Lands, and the governing body of the county and geothermal heating district in which the well will be located (ORS 522.125(1)). Any of these agencies can suggest conditions under which a permit should be granted or denied. DOGAMI is required to take State agency comments into consideration when deciding to grant a permit (OAR 632-020-0170). As part of the conditions for geothermal development on private land, a developer is required by DOGAMI to provide baseline information needed to show there would be no connection to geothermal or groundwater continuity in areas of environmental concern (*i.e.*, Borax Lake or the BLM's designated ACEC near Borax Lake). Therefore, the

DOGAMI is required to accept comment, and consider protective measures. This additional review through the DOGAMI process may benefit the Borax Lake chub through the addition of conservation measures necessary to obtain a permit for geothermal exploration.

State of Oregon, Oregon Department of Energy's Energy Facility Siting Council (EFSC)

The EFSC has regulatory and siting responsibility for proposed generating facilities greater than 35 megawatts in Oregon. The OAR-345-022-0040 prohibits the EFSC from issuing site certificates for energy development in protected areas such as BLM's ACECs and State natural heritage areas such as TNC's Borax Lake Preserve. For proposed energy developments in unprotected areas, the EFSC applies Division 22 siting standards for fish and wildlife habitat (OAR 345-022-0060), threatened and endangered species (OAR 345-022-0070), and general standards of review (OAR 345-022-000). Specific to Borax Lake chub, OAR 345-022-0060 requires that a proposed facility comply with the habitat mitigation goals and standards of the ODFW as defined in OAR 635-415-0025. The ODFW defines Borax Lake chub habitat as a Habitat Category 1 under the habitat mitigation standard. Habitat Category 1 is defined as irreplaceable, essential habitat for a species regardless of listing status, and will not change when the species is delisted. The mitigation goal for Habitat Category 1 is no loss of either habitat quantity or quality. The ODFW is required to protect habitats in Category 1 by recommending or requiring: (1) Avoidance of impacts through alternatives to the proposed development action, or (2) no authorization of the proposed development action if impacts cannot be avoided. To issue a site certificate, the EFSC must find that the design, construction, and operation of the facility, taking into account mitigation, are consistent with the fish and habitat mitigation goals and standards of OAR 635-415-0025 (OAR 345-022-0060 Fish and Wildlife Habitat).

State of Oregon, Oregon Department of Fish and Wildlife

The Borax Lake chub was listed as endangered in 1987, and then reclassified to threatened in 2017, under the Oregon Endangered Species Act (Oregon ESA; ORS 496.012), which prohibits the “take” (killing or obtaining possession or control) of listed species without an incidental take permit. The State of Oregon determined that Borax Lake chub fit the definition of threatened rather than endangered due to substantial progress in conservation and recovery of the species. The State criteria for recovery of Borax Lake chub are met due to the following: (1) TNC owns and protects the parcel containing Borax Lake and the parcel to the north of the lake; (2) natural reproductive potential is not endangered; (3) primary habitat is protected; (4) habitat is protected from commercial use; (5) public access is restricted to foot traffic; (6) no harvest is allowed; (7) only infrequent scientific or educational use occurs; (8) most surrounding land is protected from geothermal development on Federal lands; and (9) water rights of the lake were obtained by the ODFW for the purpose of conserving Borax Lake chub.

The Oregon ESA applies to actions of State agencies on State-owned or -leased land, and does not impose any additional restrictions on the use of private lands (ORS 496.192). The Oregon ESA is implemented by the State independently from the Federal Endangered Species Act; thus, this final rule does not directly impact the current State listing of Borax Lake chub. Under the Oregon ESA, State agencies (other than State land-owning or land-managing agencies) determine the role they may serve in contributing toward conservation or take avoidance (OAR 635–100–0150). The Oregon Endangered Species List is a nonregulatory tool that helps focus wildlife management and research with the goal of preventing species from declining to the point of extinction (ORS 496.171, 496.172, 496.176, 496.182, and 496.192). The ODFW commission reviews Oregon ESA-listed species at least once every 5 years to assess status relative to the recovery criteria (OAR 635-100-0120). If the ODFW commission

determines that removal from the Oregon ESA list is warranted, the commission is required to consult with relevant State and Federal agencies, cities and counties, federally recognized tribes, the Natural Heritage Advisory Council, and other States, organizations, or individuals that have a common interest in the species before making a final decision (OAR 635-100-0105). While a Federal delisting under the Act does not inherently lead to a delisting under the State ESA, it is reasonable to assume this may be considered by the ODFW commission in the future. Given the Oregon ESA does not impose regulations on private lands, the Service does not anticipate that a potential Oregon ESA delisting would alter or reduce current or future regulatory protections for the Borax Lake chub.

Per OAR 635-415-0025 (Habitat Mitigation Policy), the ODFW would provide comments and recommendations on risks to all native fish and wildlife from a proposed geothermal development project in the Alvord Basin through all State and county permitting processes. If there was any indication that a proposed geothermal development project would have a geothermal or groundwater connection with Borax Lake, the ODFW would recommend that alternatives be developed or that the action not be permitted.

The ODFW filed for water rights at Borax Lake in 1991, and that right is now certified to the Oregon Water Resources Department (OWRD 1998, entire) to prevent further attempts at diverting the water and to ensure maintenance of the water elevation in Borax Lake (see “Delisting Criterion 3” discussion, above). The purpose of the water right is to provide the required habitat conditions for the Borax Lake chub. The right is established under ORS 537.341, with a priority date of August 21, 1991. The right is limited to the amount of water necessary to maintain a surface water elevation of 4,081 ft (1,244 m) above mean sea level. The right has been recorded in the State record of Water Right Certificates as 75919 (OWRD

1998, entire). The certificate will remain in place in perpetuity. The certificate does not need beneficial use (i.e., actively used) every 5 years like many other water right certificates. As long as Borax Lake chub exist in Borax Lake, the use is being applied as intended in the water right (J. Anthony 2020, pers. comm.).

The ODFW's Native Fish Conservation Policy calls for the conservation and recovery of all native fish in Oregon (ODFW 2002, entire), including Borax Lake chub. The Native Fish Conservation Policy requires that the ODFW prevent the serious depletion of any native fish species by protecting natural ecological communities, conserving genetic resources, managing consumptive and non-consumptive fisheries, and using hatcheries responsibly so that naturally produced native fish are sustainable (OAR 635-007-0503). The policy is implemented through the development of collaborative conservation plans for individual species management units that are adopted by the Oregon Fish and Wildlife Commission. To date, the ODFW has implemented this policy by following the federally adopted recovery plan and will continue to conserve Borax Lake chub according to the State rules for conserving native fish and more specifically the commitments made by the ODFW in the CMP. The State of Oregon Wildlife Diversity Plan (OAR 635-100-0080), Oregon Native Fish Conservation Policy (OAR 636-007-0502), and the Oregon Conservation Strategy (ODFW 2016) provide additional authorities and protective measures for the conservation of native fish, including the Borax Lake chub.

Thus, the protections of ODFW's Native Fish Conservation Policy, and policy on geothermal development permitting, as well as the establishment of a dedicated water right for conservation at Borax Lake, provide for significant ongoing protection and allow for critical review of future development projects. In the event ODFW delists the species under the State

ESA, we conclude that none of these protections will be weakened due to the fact Borax Lake chub will still meet criteria under these policies.

Additionally, although not a regulatory mechanism, the CMP, which was prepared jointly and signed by the BLM, ODFW, and Service, is a conservation measure that will guide future management and protection of the Borax Lake chub, regardless of its State or Federal listing status. The CMP, as explained in more detail under **Recovery and Recovery Plan Implementation**, above, identifies actions to be implemented by the BLM, ODFW, and Service to provide for the long-term conservation of the Borax Lake chub. The approach of developing an interagency CMP for the Borax Lake chub to promote continued management post-delisting is consistent with a “conservation-reliant species,” described by Scott *et al.* (2005, pp. 384–385) as those that have generally met recovery criteria but require continued active management to sustain the species and associated habitat in a recovered condition.

Summary of Factor D

Significant regulatory protections are provided to the Borax Lake ecosystem from the conservation ownership of Borax Lake and surrounding lands by TNC (320 ac; 129 ha), withdrawal of Borax Lake waters from appropriation, the mineral withdrawal within the Alvord KGRA under the 2000 Steens Act, and the mineral withdrawal and management guidelines under the BLM’s ACEC around Borax Lake (600 ac; 243 ha); these protections remain unchanged with the delisting of the Borax Lake chub under the Act. While State and Federal regulatory mechanisms exist that would protect the Borax Lake ecosystem from potential effects of development of geothermal resources on 2,000 ac (809 ha) of private land in proximity to Borax Lake, they do not guarantee a development proposal would not legally proceed to implementation. They do, however, ensure State and Federal natural resource agencies will be

made aware of any proposals moving forward for permitting (*e.g.*, DOGAMI) and that comments by applicable State and Federal resource agencies will be considered. As noted previously, DOGAMI requires geothermal developers to provide baseline information to show there would be no connection to geothermal or groundwater in areas of environmental concern (*e.g.*, Borax Lake or the BLM's designated ACEC near Borax Lake). Similarly, the EFSC requires that a proposed facility comply with the habitat mitigation goals and standards of the ODFW as defined in OAR 635-415-0025. These regulatory mechanisms do not completely remove potential risk to the Borax Lake chub from geothermal development, but they do reduce the likelihood of impact from development on private lands in the vicinity of Borax Lake.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

The 1982 listing rule (47 FR 43957; October 5, 1982) did not identify any other natural or human-caused factors affecting the Borax Lake chub or its habitat. No threats have arisen under this threat factor since that time, and none are anticipated in the foreseeable future. Potential impacts of climate change are addressed in this final rule under *A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*, above.

Overall Summary of Factors Affecting the Borax Lake Chub

The primary factors that threatened the Borax Lake chub at the time of listing (47 FR 43957; October 5, 1982) were potential impacts from geothermal energy development, diversion of the lake's outflows by alteration of the shoreline crust, and potential development of a recreation facility. Most of these threats or potential threats have been removed or ameliorated by the implementation of actions identified in the Borax Lake Chub Recovery Plan (see the discussion of downlisting criteria under **Recovery and Recovery Plan Implementation**, above). Actions that have been taken to reduce or eliminate the destruction and modification of Borax

Lake chub habitat (Factor A) include acquisition of Borax Lake by TNC, the BLM's designation of adjacent lands as an ACEC, protection of subsurface and surface waters, protection from mineral withdrawal, and closure of fragile lands to livestock grazing and unauthorized vehicle access.

Proposals to develop geothermal energy resources in the vicinity of Borax Lake have occurred sporadically over the last 4 decades, and for that reason, it is reasonable to expect additional proposals to develop geothermal energy are likely in the foreseeable future. However, none of these proposals has moved forward with implementation over a 4-decade period, and this history leads us to conclude that the likelihood of geothermal energy development in the vicinity of Borax Lake in the foreseeable future is low. Furthermore, while geothermal development in the vicinity of Borax Lake is considered a potential threat to the Borax Lake chub, the precise effects of possible geothermal development on the species are uncertain and unpredictable given the unknown nature of geothermal fluids and their behavior deep underground. The response of the species would depend upon the specifics (*e.g.*, scale of the project and proximity to Borax Lake) of any geothermal energy development that might proceed to the implementation phase. Depending on the circumstances of any particular project, such development could potentially have a negative effect on the species, or it might have no or negligible effects. The possibility of geothermal development in the vicinity of Borax Lake will continue to represent a potential threat to Borax Lake chub and its habitat, but we have determined the likelihood of this threat becoming operative in the foreseeable future is low.

Climate change may increase the frequency and duration of above average air temperatures; when these periods coincide with warm geothermic water temperature, the combined effect may lead to reductions in the amount and suitability of habitat for Borax Lake

chub. Water temperatures regularly exceed the proposed thermal maximum for the species, and above average air temperatures may reduce the cooling of the water at the surface. However, shallow-water thermal refuge habitats around the margins of Borax Lake (the overflow channel and wetland), cool and cold water vents within the lake, increased wind velocity predicted through climate change, along with the species' ability to rebound quickly following periods of low population abundance, are expected to provide resilience against potential future effects of climate change to the Borax Lake chub.

Factor B (overutilization for commercial, recreational, scientific, or educational purposes), Factor C (disease or predation), and Factor E (other natural or manmade factors affecting its continued existence) were not identified as threat factors in the listing of Borax Lake chub in 1982 (47 FR 43957; October 5, 1982), and these factors are currently not known to be threats to the Borax Lake chub now or in the foreseeable future.

We conclude that existing regulatory mechanisms (Factor D) provide significant protections to Borax Lake chub and its habitat, especially on Federal lands, and address most of the reasons that the species was listed; we have no information to suggest that these regulatory mechanisms will change in the foreseeable future. No regulatory mechanisms are in place that fully prevent geothermal development on private lands in the vicinity of Borax Lake. However, we determined that this potential threat is not likely to manifest in the foreseeable future; therefore, we find that there is no need for additional regulatory mechanisms to address geothermal development.

Summary of Comments and Recommendations

In our proposed rule published on February 26, 2019 (84 FR 6110), we requested that all interested parties submit written comments on the proposal by April 29, 2019. We also

requested public comments on the draft post-delisting monitoring plan. We contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. We did not receive any requests for a public hearing.

During the comment period, we received 22 letters or statements directly addressing the proposed action, including 3 from peer reviewers, 1 from the State, and 18 from the public. All comments are posted at <http://www.regulations.gov> under Docket No. FWS–R1–ES–2017–0035. Some public commenters and the State support the delisting of the Borax Lake chub, some did not state whether or not they support the delisting, and others do not support delisting, although a subset of these would support downlisting to threatened status. The 3 peer reviewers do not support the delisting; however, two peer reviewers would support the species' downlisting to threatened status under the Act.

We reviewed all comments we received from the peer reviewers, the State, and the public for substantive issues and new information regarding the Borax Lake chub. Substantive comments we received during the comment period are addressed below and, where appropriate, are incorporated directly into this final rule and the post-delisting monitoring plan.

State Comments

Section 4(b)(5)(A)(ii) of the Act states that the Secretary must give actual notice of a proposed regulation under section 4(a) to the State agency in each State in which the species is believed to occur, and invite the comments of such agency. Section 4(i) of the Act directs that the Secretary will submit to the State agency a written justification for his or her failure to adopt regulations consistent with the agency's comments or petition. We solicited and received

comments from the Oregon Department of Fish and Wildlife (ODFW). The ODFW supports our delisting of the Borax Lake chub.

Peer Review and Public Comments on our Proposal to Delist the Borax Lake Chub

Comment (1): Three peer reviewers and four public commenters identified climate change as a potential threat to the long-term persistence of the species and stated that Federal protection under the Act should be maintained until we have a complete understanding of the potential impacts of climate change. The peer reviewers and commenters identified multiple potential effects of climate change, primarily the influence of increased air temperature on water temperature, and its influence on the long-term persistence of Borax Lake chub due to impacts on survival, recruitment, and habitat suitability.

Response: Climate change remains a concern for the long-term conservation of many aquatic species, including the Borax Lake chub. However, in the case of the Borax Lake chub, we do not find this concern rises to the level of justifying the retention of the species' status as endangered, or reclassifying it to threatened status. Although we do not fully understand the relationship between air temperature and other factors influencing water temperature at Borax Lake, nor the mechanisms that enable Borax Lake chub to persist during periods of high water temperature, the species has shown tremendous capacity to recover from periods of thermal stress, as we have detailed above under **Summary of Factors Affecting the Species** and the "Delisting Criterion 1" discussion. While our lack of complete knowledge of the mechanisms at work does not prohibit us from determining if the species requires protection under the Act, we acknowledge the concerns of the reviewers about how the impacts of climate change may impact the species in the future. We have modified the PDM to expand and extend the temperature monitoring currently conducted by ODFW, as suggested by several reviewers, to gain more

knowledge on trends in water temperature in Borax Lake over time. We included a threshold in the PDM that would trigger the need to visit Borax Lake and assess the condition of the species and the habitat during high temperature periods; staff from BLM or ODFW would conduct this assessment. In addition, during the PDM period, the Service and our partners will evaluate the feasibility of establishing a refuge population of Borax Lake chub at a yet-to-be-determined location in the Alvord Basin as a long-term conservation measure for the species. Lastly, if climate change degrades habitat to the point that the likelihood of the species' persistence into the foreseeable future is low, we have the discretion to use the emergency listing authorities under section 4(b)(7) of the Act, such as we used in the May 28, 1980, emergency listing of the Borax Lake chub (45 FR 35821), and will exercise it as appropriate.

Comment (2): Two peer reviewers and one public commenter highlighted that the uncertainty of factors influencing spawn timing, recruitment success, and age structure impedes the accurate prediction of the effects of climate change on the species and its habitat.

Response: Early work on the Borax Lake chub focused heavily on determining life-history characteristics of the species and evaluating the factors identified by the commenters. We acknowledge that we do not have a complete understanding of these factors, but determine that the best available scientific and commercial information supports our conclusion that the species has sufficient resiliency to withstand the predicted temperature increases, and we do not need complete clarity regarding these factors before we can assess the potential impacts of climate change. As discussed above under **Summary of Factors Affecting the Species**, the Borax Lake chub has demonstrated flexibility and variability in its life history, and the ability to quickly rebound following mortality events, which will make the species resilient to climate change.

Borax Lake chub have a prolonged spawning period, approximately October through April, although spawning appears to be infrequent through the winter. Although it is possible that increased temperatures in the fall and spring due to climate change may alter spawn timing, given the long duration over which spawning currently occurs, increased temperatures during these periods are not expected to impact the species. We have no information to determine if spawning is more successful in the fall or spring.

Comment (3): One peer reviewer identified the potential risk of habitat loss due to a possible collapse of the lake shore in the event of an earthquake.

Response: While we acknowledge there is scientific evidence the lake shore has collapsed from past earthquake activity, these catastrophic events happen on geologic timescales that far exceed our predictive capabilities. In addition, despite evidence of past lake shore collapse, the Borax Lake chub has continued to persist. In acknowledgement of the species' rarity and potential vulnerability to catastrophic events, the Service and our partners will evaluate, during the PDM period, the feasibility of establishing a refuge population of Borax Lake chub at a yet-to-be-determined location in the Alvord Basin as a long-term conservation measure for the species.

Comment (4): One peer reviewers noted that the impacts of disease are not clear, and the species may be more susceptible to disease under increased thermal stress caused by climate change.

Response: We are not aware of any impacts to the persistence of the species due to disease. Following periods of increased water temperature, we have not observed changes to the biology, condition, or population abundance of the species that would lead us to conclude that stress from increased thermal load leaves the species more vulnerable to disease. During a

cursory fish health examination, 9 of 114 (7.8 percent) fish examined were found to contain a parasitic nematode (Scoppettone *et al.* 1995, p. 39), but to our knowledge no other surveys for disease have been performed. As a part of an ongoing investigation of the role of disease and parasites in Oregon's nongame fish species, ODFW plans to study the pathogens in Borax Lake chub during the PDM period. Potential effects on the persistence of the species will be unknown until the prevalence and impacts of disease are manifest.

Comment (5): One peer reviewer and four public commenters identified isolation of Borax Lake as a potential threat to the long-term persistence of the species.

Response: Species with a limited range are inherently more at-risk from threats than species with broad distribution. However, natural rarity (*i.e.*, a species that only exists in one or a few locations, though it may be abundant there), in and of itself does not constitute a threat under the Act. Natural rarity may increase risk or vulnerability if threats are operative (*i.e.*, acting) on the species or its habitat now or in the foreseeable future, but rarity alone, in the absence of an operative threat, does not make the species warranted for protection under the Act. In some circumstances, isolation provides refuge from contagions, such as disease and invasive species.

In acknowledgement of the species' rarity and potential vulnerability to a catastrophic event, the Service and our partners will evaluate, during the PDM period, the feasibility of establishing a refuge population of Borax Lake chub at a yet-to-be-determined location in the Alvord Basin as a long-term conservation measure for the species.

Comment (6): One public commenter noted that Borax Lake chub population abundance was generally unstable, and identified the need for population stability prior to delisting.

Response: Population variability, with opportunistic demographic resilience, is relatively common for small-bodied desert fishes in the Cyprinid family of fishes (Winemiller 2005, pp. 878–879). The ability of the population to rapidly respond to changes in habitat condition is likely an adaptation that has made the species resilient in Borax Lake. We do not have concerns that interannual fluctuations in adult abundance pose a threat to the persistence of the species.

Comment (7): One public commenter expressed concern about predation on Borax Lake chub.

Response: Predation was not identified at the time of listing as a threat, and we do not view predation as a threat now or in the foreseeable future. Water temperature and chemistry at Borax Lake create unsuitable habitat conditions for most common aquatic predatory species that might be illegally introduced. Several native species that are likely predators of Borax Lake chub, such as garter snakes and common grebes, are found in and around Borax Lake. The Borax Lake chub both evolved and has persisted in this habitat in the presence of these predatory species.

Comment (8): One public commenter noted that Borax Lake chub are categorized “vulnerable” by the International Union for the Conservation of Nature (IUCN), and this demonstrates the need to maintain protections for the species under the Act.

Response: Although the species is listed as vulnerable by the IUCN, this does not automatically equate to the need for Federal protections under the Act. Like many narrow endemic species, Borax Lake chub will remain vulnerable to threats. However, the threats that led to the Federal listing of the species have been ameliorated to the degree that we have determined protections under the Act are no longer warranted. Monitoring of the status of Borax Lake chub will be maintained following the delisting of the species through the PDM.

Additional monitoring and other conservation efforts will be conducted through the CMP, although we do not rely on the CMP for this delisting determination.

Comment (9): Four public commenters expressed concern that the threat of geothermal development in proximity to Borax Lake has not been fully ameliorated, and this threat may increase if Federal protections are removed.

Response: As discussed in detail above under **Summary of Factors Affecting the Species**, *Factors A* and *D*, since the Borax Lake chub was federally listed under the Act, there have been several changes in land ownership and management that greatly reduce the likelihood of geothermal development in proximity to Borax Lake, including passage of the Steens Act of 2000, the BLM's designation of 600 ac (243-ha) around Borax Lake as an ACEC, and the acquisition by TNC of 320 ac (130 ha) that contain and border Borax Lake, which put all critical habitat for the species under public or conservation ownership. The combination of these regulatory and conservation-driven protections greatly reduce the potential for impacts to Borax Lake chub from any future geothermal development.

That said, we acknowledge some privately owned land surrounding Borax Lake is not subject to BLM's withdrawal, and proposals to develop geothermal energy resources in the Borax Lake vicinity occurred sporadically in the past. However, no past proposals have moved forward over a 4-decade period, and the likelihood of geothermal energy development now and in the foreseeable future is low. Furthermore, the precise effects of possible geothermal development on the species are uncertain and unpredictable, depending on the project scale and proximity to Borax Lake. If an assessment suggested a future geothermal project would likely cause significant risk to Borax Lake and the well-being of Borax Lake chub, we have the discretion to use the emergency listing authorities under section 4(b)(7) of the Act. The

possibility of geothermal development in the vicinity of Borax Lake will continue to represent a potential threat to Borax Lake chub and its habitat, but we have determined the likelihood of this threat becoming operative in the foreseeable future is low.

Comment (10): Three public commenters noted that there is scientific uncertainty in the Service's decision to delist, and while the species has met recovery criteria, it may become an endangered species again in the future.

Response: There is almost always uncertainty associated with scientific data and predictions of such data into the future. Uncertainty is not a reason to keep a species listed under the Act if it no longer meets the definition of an endangered or a threatened species. We must delist species that we determine no longer meet the Act's definitions of a threatened species or an endangered species. The Borax Lake chub has clearly met recovery criteria and does not have operative threats now or in the foreseeable future. If unforeseen threats arise that are determined to endanger or threaten the long-term persistence of Borax Lake chub, we have the discretion to use the emergency listing authorities under section 4(b)(7) of the Act, such as we used in the May 28, 1980, emergency listing of Borax Lake chub (45 FR 35821).

Comment (11): Four public commenters expressed concerns about land use at and around Borax Lake, and potential impacts to the species. The commenters specifically mentioned development, over-fishing, grazing and livestock use, and vehicle access.

Response: Although signs of historical development, vehicle, and livestock use are present around Borax Lake, this use occurred prior to the construction of a perimeter fence by the BLM and TNC in 2011. Some unauthorized access has occurred since 2011, and the BLM and TNC quickly responded and modified the fence and gate to prohibit further unauthorized vehicle access. There is some use of Borax Lake by the public, but the threat of impacts to the

habitat by vehicle use has been mitigated. We are not aware of any harvest of Borax Lake chub by the public and do not agree that over-fishing will threaten this species in the future. Similarly, concerns over development in the region are not likely to manifest themselves in the near future, as the Alvord basin is sparsely populated, and Borax Lake is roughly 3 mi (4.8 km) away from the nearest privately owned property; in addition, the likelihood of geothermal development is considered low. We conclude that land use is not likely to impact Borax Lake chub in the foreseeable future.

Peer Review and Public Comments on our Post-delisting Monitoring Plan

Comment (12): Two peer reviewers highlighted the value of water temperature monitoring at multiple locations in Borax Lake during the PDM period to provide information on the impacts of climate change on water temperatures. In addition, the reviewers identified the need for triggers in the PDM in response to high summer water temperatures that would signal the need to assess Borax Lake chub population abundance. One of the reviewers specified the need for a plan to monitor and respond to short-term events that require immediate management.

Response: Although it was not discussed in the draft PDM, ODFW has maintained water temperature monitoring equipment at multiple locations around Borax Lake since 2005. In 2011, ODFW installed additional monitoring equipment to track water depth, air pressure, and air temperature. These data are useful for observing trends in habitat suitability, and provide context for the population monitoring. We have added temperature monitoring as a component of the PDM.

Previous mortality events have occurred during periods when high water and air temperatures coincided. Although we have no plans to remotely monitor water temperatures, monitoring Borax Lake during times of high air temperature may be prudent. To accomplish

this, we have added an additional monitoring trigger to the PDM: If maximum daily air temperature is projected to exceed 37.8 °C (100 °F) for 7 consecutive days, or maximum daily air temperature exceeds 45 °C (113 °F) on a single day, based on regional forecasting. The selection of these air temperature thresholds were based on high temperatures observed over the last decade.

In response to this trigger, managers will plan a site visit to assess the health of the chub population. This would include walking the shoreline to check water temperature, and visually detect mortalities and locate live fish. If live fish are not observed, managers will plan to set minnow traps for brief periods (*e.g.*, 1 to 3 hours) in areas where water temperatures are the coolest. If no fish are captured in minnow traps, managers will conduct an assessment of the population under the protocols described in the PDM at the earliest possible time. This will be done once air and water temperatures cool, to lessen stress to the fish.

Comment (13): One peer reviewer recommended incorporating regular aquatic invasive species monitoring in the PDM.

Response: The draft PDM stated that monitoring should follow the protocols established by ODFW (Scheerer *et al.* 2012, p. 4), but it did not provide details regarding methodology. We included additional detail in the final PDM to address this issue and provide more clarity. Since 2005, managers have conducted annual shoreline surveys to take pictures of Borax Lake from established photo points, maintain data logging equipment, and assess the condition of the shoreline and extent of vegetative growth in the wetland. The survival of nonnative species in Borax Lake is unlikely given the high water temperatures and water chemistry. We developed an additional PDM trigger if a nonnative species likely to prey on Borax Lake chub, compete

with Borax Lake chub, or otherwise negatively impact the habitat suitability of Borax Lake or the life history of Borax Lake chub is detected.

Comment (14): One peer reviewer suggested population monitoring of Borax Lake chub every 2 years, rather than 3 as written in the draft PDM, based on the current demographic information.

Response: Regular population monitoring is important during the PDM period, but we have concluded that sampling every 3 years is prudent. The age structure and life history of Borax Lake chub is poorly understood, and some biologists have speculated that the species might be primarily an annual species (Scheerer *et al.* 2015, p. 9). Previous mortality events appear to occur during periods when high water and air temperatures coincided, and thus we included a PDM trigger to assess the population following a period of thermal stress, as described under our response to *Comment (12)*. We have concluded that monitoring every 3 years, with additional sampling following of periods of high air temperature, will provide enough information to assess the health of the population during the PDM period.

Determination of the Status of the Borax Lake Chub

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of an “endangered species” or “threatened species.” The Act defines an “endangered species” as a species that is “in danger of extinction throughout all or a significant portion of its range” and a “threatened species” as a species “that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The Act requires that we determine whether a species meets the definition of “endangered species” or “threatened species” because of any of the following factors: (A) The present or threatened destruction, modification,

or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or manmade factors affecting its continued existence.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we found that significant threats identified at the time of listing (47 FR 43957; October 5, 1982) have been eliminated or reduced. We recognize that under Factor A (the present or threatened destruction, modification, or curtailment of its habitat or range), the possibility of geothermal development in the vicinity of Borax Lake will continue to represent a potential threat to the Borax Lake chub and its habitat, but we have determined the likelihood of this threat becoming operative in the foreseeable future is low. We did not identify any other threats from development on private lands in the vicinity of Borax Lake. We have identified climate change as a new potential threat to the Borax Lake chub, but the magnitude and frequency of this potential threat are generally unknown at this time. The largest impact identified by the potential threat of climate change is related to cumulative impacts of increased air temperature and variability in geothermal water temperature, yet the species' capacity to persist through changes in temperatures has been well demonstrated. In the fall of 2017, the estimated population abundance for Borax Lake chub was twice as high as any previous estimate while water temperature was higher than the suggested thermal tolerance for a longer duration than any period in the 2005–2016 record. We conclude that there are no threats to the Borax Lake chub under Factor B (overutilization for commercial, recreational, scientific, or educational purposes), Factor C (disease or predation), or Factor E (other natural or manmade factors affecting its continued existence). We conclude that under Factor D (the inadequacy of existing

regulatory mechanisms), the existing regulatory mechanisms provide significant protections to the Borax Lake chub and its habitat, especially on Federal lands, but they do not address potential impacts of geothermal development on private lands. However, the BLM designated 520 ac (210 ha) of public land surrounding Borax Lake as an ACEC to protect Borax Lake chub and its habitat, and regulatory mechanisms exist that would ensure State and Federal natural resource agencies will be made aware of and provide comment on any private development proposals moving forward for permitting. Therefore, we have determined that the likelihood of the threat of geothermal development in the vicinity of Borax Lake becoming operative in the foreseeable future is low; therefore, no regulatory mechanisms are needed to address this potential threat. All of these threats apply similarly throughout the range of the species in Borax Lake.

Thus, after assessing the best available information, we conclude that the Borax Lake chub is not currently in danger of extinction, and is not likely to become so within the foreseeable future, throughout all of its range.

Determination of Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range.

Having determined that the Borax Lake chub is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so in the foreseeable future in a significant portion of its range. The range of a species can theoretically be divided into portions in an infinite number of ways, so we first screen the potential portions of the species' range to determine if

there are any portions that warrant further consideration. To do the “screening” analysis, we ask whether there are portions of the species’ range for which there is substantial information indicating that: (1) The portion may be significant; and (2) the species may be, in that portion, either in danger of extinction or likely to become so in the foreseeable future. For a particular portion, if we cannot answer both questions in the affirmative, then that portion does not warrant further consideration and the species does not warrant listing because of its status in that portion of its range. We emphasize that answering both of these questions in the affirmative is not a determination that the species is in danger of extinction or likely to become so in the foreseeable future throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required.

If we answer these questions in the affirmative, we then conduct a more thorough analysis to determine whether the portion does indeed meet both of the significant portion of its range prongs: (1) The portion is significant; and (2) the species is, in that portion, either in danger of extinction or likely to become so in the foreseeable future. Confirmation that a portion does indeed meet one of these prongs does not create a presumption, prejudgment, or other determination as to whether the species is an endangered species or threatened species. Rather, we must then undertake a more detailed analysis of the other prong to make that determination. Only if the portion does indeed meet both significant portion of its range prongs would the species warrant listing because of its status in a significant portion of its range.

At both stages in this process—the stage of screening potential portions to identify any portions that warrant further consideration and the stage of undertaking the more detailed analysis of any portions that do warrant further consideration—it might be more efficient for us to address the “significance” question or the “status” question first. Our selection of which

question to address first for a particular portion depends on the biology of the species, its range, and the threats it faces. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the second question for that portion of the species' range.

We evaluated the range of the Borax Lake chub to determine if any area may be a significant portion of the range. The Borax Lake chub is a narrow endemic that functions as a single, contiguous population and occurs within a very small area. The species occurs in Borax Lake in the Alvord Basin and its historical known natural range is limited to Borax Lake and associated outflows and wetlands. Based on the small range of the Borax Lake chub, approximately 10.2-ac (4.1-ha), we determined that there are no separate areas of the range that are likely to be of greater biological or conservation importance than any other areas due to natural biological reasons alone. Every threat to the species in any portion of its range is a threat to the species throughout all of its range, and so the species has the same status under the Act throughout its narrow range. Therefore, we conclude, based on this screening analysis, that the species is not in danger of extinction or likely to become so in the foreseeable future in any significant portion of its range. Our conclusion—that we do not undertake additional analysis if we determine that the species has the same status under the Act throughout its narrow range—is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018); *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d , 946, 959 (D. Ariz. 2017); and *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020).

Determination of Status

Our review of the best available scientific and commercial information indicates that the Borax Lake chub does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we are removing the Borax Lake chub from the List of Endangered and Threatened Wildlife.

Effects of this Rule

This rule revises 50 CFR 17.11(h) to remove the Borax Lake chub from the Federal List of Endangered and Threatened Wildlife. On the effective date of this rule (see **DATES**, above), the prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, no longer apply to this species, and Federal agencies are no longer required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect the Borax Lake chub. This final rule also revises 50 CFR 17.95(e) by removing the designated critical habitat for Borax Lake chub throughout its range. Current State laws protecting the Borax Lake chub will likely remain enforceable and continue to provide protection for this species.

Post-delisting Monitoring

Section 4(g)(1) of the Act requires us, in cooperation with the States, to implement a system to monitor effectively, for not less than 5 years, all species that have been recovered and delisted. The purpose of this post-delisting monitoring is to verify that a species remains secure from risk of extinction after it has been removed from the protections of the Act. The monitoring is designed to detect the failure of any delisted species to sustain itself without the protective measures provided by the Act. If, at any time during the monitoring period, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing under section 4(b)(7) of the Act. Section 4(g) of the Act

explicitly requires us to cooperate with the States in development and implementation of post-delisting monitoring programs, but we remain responsible for compliance with section 4(g) of the Act and, therefore, must remain actively engaged in all phases of post-delisting monitoring. We also seek active participation of other entities that are expected to assume responsibilities for the species' conservation post-delisting.

Post-Delisting Monitoring Plan Overview

We prepared a PDM plan for the Borax Lake chub, building on and continuing the research that has taken place in the time since the species was listed. The PDM plan discusses the current status of the taxon and describes the methods to be used for monitoring after the taxon is removed from the Federal List of Endangered and Threatened Wildlife. Monitoring Borax Lake chub under the PDM will follow the same sampling protocol used by the ODFW prior to delisting. Monitoring will consist of several components: Borax Lake chub abundance, invasions of nonnative species, potential adverse impacts during periods of high air temperature, potential adverse changes to Borax Lake chub habitat, and monitoring DOGAMI for drilling applications. The PDM will consist of annual monitoring of all components, except surveys to estimate population abundance, which will be conducted once every 3 years over a 10-year period (four population surveys total), which will begin following the effective date of this rule (see **DATES**, above). Given the Borax Lake chub is a short-lived fish (few survive beyond 1 year; Scopettone *et al.* 1995, p. 36), periodic monitoring over this time period will allow us to address any possible negative effects to the Borax Lake chub. Additionally, the chub experienced wide fluctuation in its population year-to-year. Limited point estimates for a widely fluctuating population can lead to difficulty assessing long-term trends. Therefore, although the minimum PDM period required by the Act is 5 years, as described above, we chose to extend the

population abundance monitoring cycle to once every 3 years and the total monitoring period to 10 years to ensure we can accurately measure changes in trends.

The PDM plan identifies measurable management thresholds and responses for detecting and reacting to occurrence of nonnative species or significant changes in the Borax Lake chub's habitat, distribution, abundance, and persistence. If declines are detected equaling or exceeding these thresholds, the Service, in combination with other PDM participants, will investigate causes of these declines, including considerations of habitat changes, substantial human persecution, stochastic events, or any other significant evidence. The result of the investigation will be to determine if the Borax Lake chub warrants expanded monitoring, additional research, additional habitat protection, or relisting as an endangered or a threatened species under the Act. If such monitoring data or an otherwise updated assessment of threats (such as specific information on proposed geothermal development projects) indicate that relisting the Borax Lake chub is warranted, emergency procedures to relist the species may be followed, if necessary, in accordance with section 4(b)(7) of the Act.

Required Determinations

National Environmental Policy Act

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244).

Government-to-Government Relationship with Tribes

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), Executive Order 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We do not believe that any Tribes will be affected by this rule. However, we contacted the Burns Paiute Tribe to coordinate with them regarding the proposed rule to delist the Borax Lake chub. We provided the Tribe with a copy of the proposed rule and draft PDM, but we did not receive any comments from them.

References Cited

A complete list of all references cited in this final rule is available at <http://www.regulations.gov> at Docket No. FWS-R1-ES-2017-0035 or upon request from the person listed under **FOR FURTHER INFORMATION CONTACT**.

Authors

The primary authors of this final rule are staff members of the Service's Oregon Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we hereby amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

§17.11 [Amended]

2. Amend § 17.11(h) by removing the entry for “Chub, Borax Lake” under FISHES from the List of Endangered and Threatened Wildlife.

§17.95 [Amended]

3. Amend § 17.95(e) by removing the entry for “BORAX LAKE CHUB (*GILA BORAXOBIUS*).”

Aurelia Skipwith,
Director, U.S. Fish and Wildlife Service.

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